THE

AMERICAN JOURNAL OF PHARMACY.

JANUARY, 1858.

PURIFICATION OF LIQUIDS IN THE STATE OF VAPOR. NEW APPARATUS FOR RECTIFYING SPIRITS.

By Edward R. Squibb, M. D.

Some two years since it occurred to the writer that various liquids might be well and easily purified and isolated, during the processes for their production, by washing the vapor as produced, just as fixed gases have long been washed and purified.

The first practical application of this method was in the manufacture of ether, wherein the vapors from the still were made to pass first through milk of lime, then through a cooler kept at a fixed temperature, and then through dry chloride of calcium.

This experiment having been quite successful, the application was extended to the processes for chloroform, and hyponitrous ether (for spirit of nitre)with the same success. The conditions necessary are simply that the vapor shall pass into the purifying liquid in a finely divided state, as through a delivery tube perforated with fine holes; and that the purifying liquid be kept at a temperature as near as possible to, but always above the boiling point of the liquid whose vapor is to be purified. Or, if the purifying agent be dry that the vapor be passed through repeated portions of it, under the same condition of temperature of course. Thus these purifiers are simply introduced between the still and final condenser in the apparatus for manufacture.

After the successful application of this method, in examining into the manufacture of alcohol in search of the difficulty there is in getting a spirit that is free from the grain oil impurities, it appeared to the writer that the method was easily applicable to the manufacture of "Cologne spirit," as the better kind of alcohol is now called. In the production of this Cologne spirit, the rectifying distillers "leech" the whiskey by passing it

through a stratum of coarsely powdered wood charcoal in large tubs called "leeches." Those who are most careful in this preparatory "leeching" always produce the "cleanest" alcohol. The more dilute the crude spirit is, the more perfectly it is cleansed in the leeches. Hence the more careful rectifyers "reduce" or weaken their whiskey before leeching.

The charcoal used by the most successful manufacturers is that made from twigs and small branches. This charcoal they reburn in kilns of their own, and then grind it into coarse powder, commonly with iron balls in a revolving sheet-iron cylinder. The fine powder being separated and rejected, the coarser is spread between folds of blanket upon a false bottom in the "leeches," to the thickness of six or eight inches, and held in place by stones. The dilute whiskey is then poured upon it and made slowly to percolate it. The cleansed portions of the percolate are then distilled.

In applying the method of vapor purification, of course all this tedious, troublesome and expensive "leeching" would be done away with, and the result be better secured. The experiment appeared worthy of trial, and consequently a model apparatus was set up, and worked with the anticipated result, cleaning all the alcohol from ten gallons of common new whiskey at one process of distillation with about eighteen ounces of common unprepared wood charcoal, and effecting the cleaning so perfectly that solution of nitrate of silver gave no precipitate or blackening after standing with the alcohol exposed to sunlight during many days. A spirit so entirely free from oils is only rarely obtained in the ordinary way, and then constitutes but a very small portion of the "run" of any given "charge."

Following this result, (now some five months.) A much larger apparatus was erected, and from this larger apparatus the following figures and description are given :

The apparatus consists of a still, *a*, column, *b*, upright cooling worm or "goose," *c*, two purifiers *d* and *d'*, and a final condensing worm. The scale of the centre section drawing is $\frac{1}{4}$ inch to the foot.

The still is of tinned copper of about eighty gallons capacity, and works a charge of two barrels at a time. It is furnished with a steam-heating coil of $\frac{3}{4}$ inch brazed copper pipe, tinned

outside, sixty-four feet in length; with a discharging cock; a tell-tale cock for regulating the charge; a charging screw; an air cock; a long thermometer; and a coupling for the weak spirit return-pipe.

The column, also of well tinned copper, is fifteen inches diameter by ten feet high, (ten feet eight inches including cap or cover.) For convenience of management this is divided into three parts, held together by composition flanches and bolts and nuts. The lower division is four feet high, and the others each three feet. The whole column is separated into fifteen compartments, the lower one twelve inches and each of the others eight inches deep. The lower compartment has the "plunger" arrangement commonly used in columns for rectification; that is, a tinned copper tube four inches wide and eight inches high, soldered over an opening in a fixed diaphragm, through which the vapors have to pass from the still. Over this tube is held an inverted cup six inches wide by eight inches high, in the position shown in the sketch. The side of this plunger chamber has three perforations with corresponding stop cocks. The lower cock is for emptying the chamber completely, and is only used at the end of a working, or when the column has to be taken down. The middle one is for communication with the still, and serves to regulate the level of the weak spirit in the chamber during the ordinary working. It is always open, except for a short time previous to, and during the discharge of the exhausted or spent liquors of the still. The upper cock admits the weak spirit return from the goose and purifiers into this chamber, and is kept open during the greater part of the "running."

Above the plunger chamber is a moveable tinned copper diaphragm, supported by a narrow rim or ledge soldered around the inside of the column. This diaphragm (represented both in plane view and section by fig. 2) is turned up round the edge so as to form a cup $\frac{3}{8}$ inch deep. Just within the edge it is perforated all round with a ring of $\frac{1}{4}$ inch holes, punched from below upward, so as to leave a burr or rim round each hole about $\frac{1}{8}$ inch high. At a distance from the edge, double that to the centres of the holes, say one and a half inches from the edge, is soldered a cylinder of tinned copper wire cloth, of eight meshes to the inch. This wire cloth cylinder, previously made by soldering, is

twelve inches in diameter and eight inches high. Just within this cylinder the diaphragm is perforated with a ¼ inch diameter dripping pipe eight inches long. This is soldered into the diaphragm so as to project ¼ to ⅜ inch above its surface, and to reach within the same distance of the surface or floor of the chamber below. This dripping tube forms an overflow to the floor of each chamber, for the weak spirit in descending the column. The diaphragm is also perforated by a small hole punched from above downward, on the side opposite the dripping tube. This small hole serves to drain each chamber when the apparatus is at rest. When this diaphragm and its cylinder are in place, the space between the cylinder and the inside of the column, over the ring of holes, is filled with carefully separated clean small gravel stones or pebbles, or with coarsely powdered charcoal, or with any other similar matters offering large contact surface and bad conducting powers. The vapor in its ascent under the pressure from the still below must pass from the plunger chamber through the ring of holes, and through the stratum of pebbles and wire cloth into this second chamber; and in so doing its temperature is lowered, and it deposits some of its spirit, but more of its water, in the liquid condition. This condensed portion is boiled and redistilled from the surfaces and shallow pan in which it is deposited by the heat given off from the next succeeding portions of slowly cooling and condensing vapors, and so on the process of redistillation, and draining back of weaker and weaker spirit is repeated or continued all the way up the column. The third chamber is formed by a diaphragm represented by fig. 3, of the same size, similarly turned up at the edge and similarly furnished with a dripping pipe and draining hole. This diaphragm, however, instead of the ring of small holes near the edge, has a single opening in the centre, four inches in diameter, the edges of the opening being turned up like the outer edge. Around this opening is soldered the lower edge of a cylinder of wire cloth of corresponding diameter and eight inches high. Around this cylinder and concentric with it is soldered another cylinder of double the diameter, but of the same height. This leaves an interspace of about two inches thickness to be filled with pebble stones, and through which the vapors must pass in their serpentine course from the second to the third

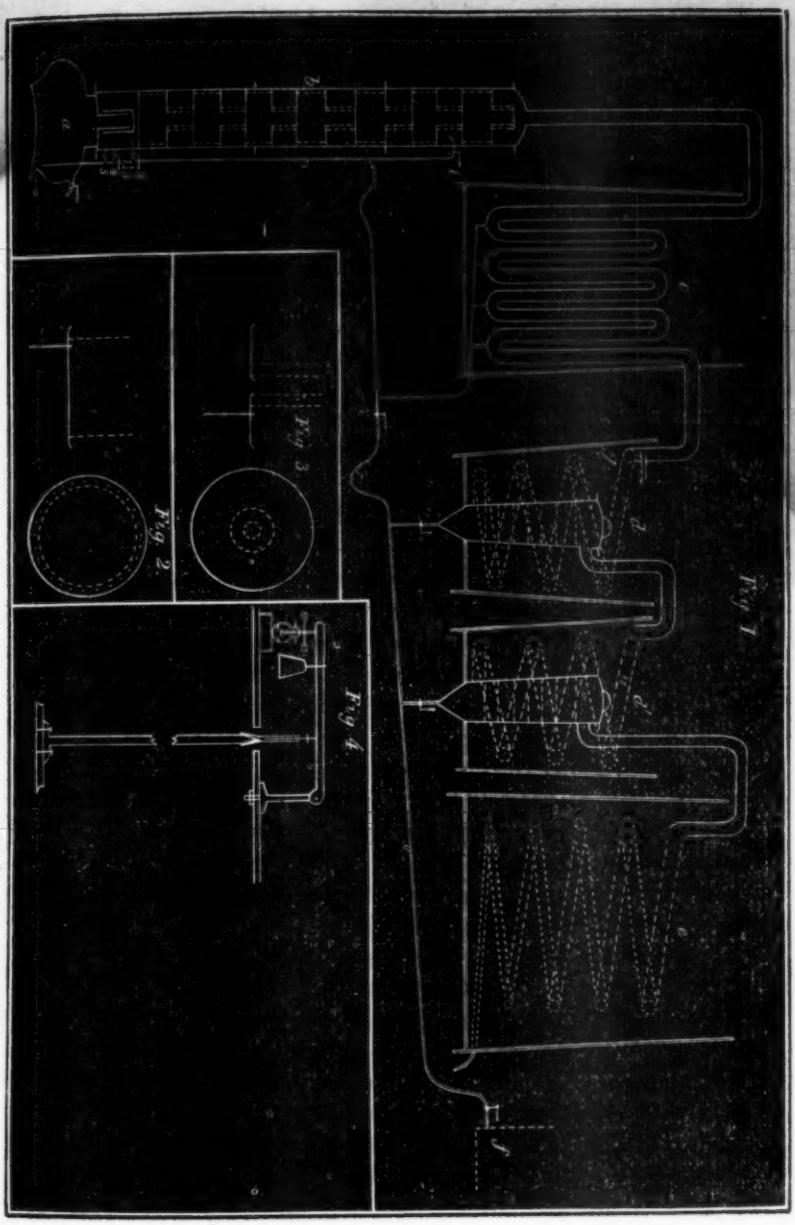


Fig 1
Fig 2.
Fig 3
Fig 4

chamber. This pair of diaphragms and cells represent the whole of the remainder of the column, and they rest one upon another throughout the whole column, except that the diaphragm nearest the lower end of each of the three divisions of the column is soldered fast in its place to prevent any crushing effect upon the wire cloth cylinder, and to facilitate the taking down and setting up of the column. In these distillations and washings of the vapor in its tortuous passage, and its percolations, a very large proportion of the oils and impurities is separated and drained back into the still with the water, so that the alcohol vapor, with a comparatively small portion of impurity and watery vapor, passes up the three inch tinned copper tube into the upright cooler or goose, *c*.

This goose is made from three inch copper pipe, tinned inside and out. It consists of 12 pairs of erect pipes and bends, and contains about 50 feet of the pipe. Its arrangement is not precisely as shown in the drawing, as that would not adapt it to a circular tub. But its form is that of a compressed or flattened spiral, the ends being brought together to form a circle. From the lowest point of each lower bend a half inch pipe passes downward into an inch receiving pipe. The half inch pipes are all of different and diminishing length, and are "picked up" in turn by the larger pipe as it passes from the shortest of these round the circle to its place of exit, from the side of the tub near the bottom, on its way to return to the column and still. By this arrangement the goose is kept free from condensed water and weak spirit, these latter being drained back for re-distillation. The water of the tub, in which this goose is immersed, is, by a carefully regulated flow of cold water, kept steadily at a temperature of 172° to 180°. This regulation of the temperature is of great importance as it regulates the strength of the alcohol resulting, and it is a matter of much difficulty, particularly when a varying pressure of steam in the steam boiler, or the varying height and strength of the charge in the still, causes the still to work irregularly. To effect the object of regulating this temperature more perfectly, without trouble or attention, the writer has arranged an automatic contrivance on the principle of the thermometer, as sketched in figure 4. A piece of common one inch iron steam pipe, of a length corresponding to the depth of

water in the tub, is hermetically sealed at the bottom, and received into a flanch there, and by this flanch bolted to the centre of the bottom of the tub. The upper end of this piece of pipe is fitted with an ordinary steam fitter's reducing socket, and by this adapted to receive a short piece of ¼ inch iron pipe in continuation. This piece of ¼ inch pipe is bored out true and screwed in perfectly tight. This small pipe is fitted with a piston having a long bearing for packing, and the piston and rod have a narrow passage way drilled throughout their entire length. The upper end of this channel is perfectly secured by a soft iron screw plug. A fine screw thread is cut upon the outside of the upper end of this piston rod, and over this passes a female portion with an internal thread, furnished at some portion with a milled head for facility of turning. This arrangement enables the operator to lengthen the piston rod at pleasure, in adapting the contrivance to different degrees of temperature, or in adjusting it nicely to any desired degree. The rounded upper end of this female portion bears upon a lever arranged upon a stout bar of wood across the top of the tub, and weighted as shown in the figure. The weight upon the lever is so adjusted as to close a valve against the head of water in the cold water pipes which supply the tub, but pressure on the lever from the piston rod head raises the weight, and allows the head of water to raise the valve so that the tub may be supplied. The iron tubes are filled with mercury, the packed piston put in place, and the channel in its centre filled with mercury to the careful exclusion of air, and the little plug screwed tightly into its place, so as to hermetically seal the carefully filled mercury column. The apparatus being thus arranged, as the water in the tub becomes heated the mercury expands, and the expansion is multiplied in the small pipe where it pushes up the piston. The milled head of the female part is turned so as to shorten the piston as the expansion takes place, till the water rises to the desired degree of temperature. Then the farther expansion is allowed to act upon the lever and raise the closing weight of the valve, which it does just in proportion to the amount of the expansion from the temperature of the water. The principal difficulty in the practical application of this simple contrivance,

is in the packing of the piston, but this difficulty is by no means insurmountable.

The vapor pipe from the goose, now conveying alcoholic vapors nearly freed from watery vapor, and comparatively free from impurities, has its exit through the side of the goose tub, and enters the tub of the first purifier. The purifying tubs are two in number, *d* and *d'*, and they are precisely alike in arrangement. They are furnished with a worm about 25 feet in length, of light two-inch lead pipe, to lead the vapor from the goose exit-pipe to the purifiers proper. The purifiers are slightly conical vessels of 6 lb. sheet lead, 3 feet long, by 18 inches diameter at the larger upper end, where the lead is soldered to an iron ring furnished with an iron cover. The narrower lower end of the leaden vessel passes water-tight by means of a leaden flanch through the bottom of the tub, and then terminates in a leaden funnel, pipe (½ inch) and stop-cock. The vapor entrance into the purifier is close to the bottom of the tub. The purifiers are furnished each with seven shelves of tinned copper wire cloth, soldered to tinned copper rings, of such sizes as to be arrested at regular points by the approaching sides of the vessel. Upon these shelves the coarsely powdered charcoal is spread, in strata of two or three inches thickness. The vapor then admitted below, must successively pass through all these fourteen strata of charcoal in succession, before being admitted finally into the condensing worm, and is thus deprived of all remaining impurity. The water of these tubs, in which the purifiers are immersed, is kept, by means of a small coil of steam pipe, at a temperature just about the boiling point of the alcohol as it issues from the condensing worm. All the watery vapors and impurities condensed in the purifiers drain off, and are conducted back into the still through the ½ inch leaden pipe shown. The pipe, before it joins the larger one leading from the goose, is "trapped" or bent downward into a looped form. This bend, being always full of weak spirit, prevents the passage of vapor by this channel into the purifiers, whilst it offers no obstruction to the passage of the liquid towards the still. Another similar trap is made in the larger pipe as it approaches the column, to prevent the vapor, under the pressure from the still from passing by this route into the goose. The ½ inch pipe, which drains the purifiers,

is continued on back to a "charging back" for supplying fresh spirit slowly to the still, in the manner to be mentioned in describing the working of the apparatus.

The shelves of the purifiers may be supplied with quick or slaked lime, with chloride of calcium, or, indeed, with any desired purifying material, whereby alcohol, or any other vapor, may be purified or dehydrated at pleasure. A connection with other stills, as for chloroform, ether, &c., at the point *g*, adapts this purifying and condensing apparatus to use for these vapors as well.

To prepare the apparatus for use, the disks are placed in the column from below upward, and the interspaces filled with well washed pebble stones or charcoal. The pebbles or charcoal should be separated from the finer and coarser particles by two sieves or riddles, one of eight and the other of four meshes to the linear inch. When pebbles alone are used, about 320 lbs. will be required. The three sections of the column are then put together and secured by the bolts and nuts, and the column then connected to the goose. The automatic water valve is prepared by filling the large tube, to within four inches of the top, with mercury, say 28 lbs. Water is then poured in till the whole of the tube is filled. The piston is prepared by cutting out and perforating little disks of sole leather, which has been previously hammered well, and soaked in melted tallow. The disks are strung upon the portion of the piston rod adjusted to receive them, and then firmly compressed into place by screwing the button-like end of the piston upon them. The piston and rod is then put into a lathe, and the packing carefully turned to the proper size to fit the tube closely. It is then well greased with tallow and put in place, the water being allowed to overflow through the upper end as it goes down. The little soft iron plug is then screwed in tightly, and the milled head cover put on. The goose tub being filled with water, the water is heated by passing steam into it till it acquires a temperature of about 174°. During this heating up, the milled head cover is screwed down upon the piston rod as that is forced up by the expansion of the mercury, till the desired point is reached. Then the end is allowed to act upon the lever so as to admit cold water.

If the goose tub be large enough and deep enough in its pro-

portions to the size of the goose, this arrangement may be omitted, as the circulation of the large body of water, with the radiation and evaporation, keeps the temperature down without much necessity for supplying cold water, particularly if the still works regularly. With the proportions given and without using the automatic valve, the temperature of the water often does not vary two degrees for three or four hours at a time.

The purifiers, when used for alcohol, are prepared for use by placing coarsely powdered recently burned charcoal upon the shelves or disks of wire cloth to the depth of two or two and a half inches on each, so that the two require about 18 lbs. to charge them. The iron covers are then bolted on, the tubs filled with water, and the temperature of the water raised to 170° to 176°, and maintained at that temperature steadily.

The condensing worm tub is of course supplied with cold water, and the charging back filled with whiskey or the dilute spirit to be rectified.

The still is then charged up to the overflow cock, say 58 to 60 gallons, and the whole apparatus is ready for working.

A good head of steam turned into the heating coil of the still sets it boiling rapidly in ten or fifteen minutes. Then the head of steam is checked off to a moderate working flow, and the distillation is commenced. Stopcocks 1, 3 and 5 are closed, and also that of the charging back *f*, the others being open. The spirit is redistilled and cooled in each chamber as it ascends the column, and is distributed over a very large surface, and washed as it passes through the various strata of pebbles, the water and weak spirit condensed draining back with the more easily condensed oils into the still to be again boiled. The vapor freed from most of the impurities and water then passes to the goose, where more of the water is separated as weak spirit and drained back into the still for redistillation. The vapor has its temperature again equalized in the short worm of the purifier, and then passes more slowly through all the strata of charcoal in succession, still depositing a portion of weak spirit to be returned to the still, until it finally passes into the condensing worm in a pure state. Here it is all condensed, and escapes from the eduction pipe at the rate of a gallon every six or seven minutes.

As soon as the distillation is fairly under way, the stop cock

of the charging back is opened just so far as to supply the still with fresh spirit, (along with the returning weak spirit,) at about the rate of the distillation of clean spirit, so that the still may be maintained at about the same level. Then, if the steam does not vary much in pressure, it will work very regularly for a long time, or until the proportion of water to the spirit increases so as materially to raise the boiling point. The strength of the boiling mixture is very conveniently indicated by the immersed thermometer inserted in the breast of the still. At starting, the boiling point of ordinary whiskey, say "16 per cent. above proof," is about 185°, and from this it slowly rises as the spirit distills off, till at the close of the "run" the charge is known to be exhausted or "spent," and ready to discharge or "waste," by the indication of the thermometer, when the temperature ceases to rise. The boiling point of the residuary liquor, under the working pressure of the still, is about 216° to 218°. Before discharging the spent liquor from the still, stopcocks 2 and 4 are closed, and thus the farther return of weak spirit is cut off by closing all communication with the still till the still is ready for the new charge. The large stopcock, 3, is then opened, as well as that of the charging back, and the still thus supplied with a new charge without arresting the process. Stopcock 1 is useful at times during the early part of the run, in order to run a portion of the return spirit in at the upper part of the column, and thus to check the rate of distillation while the boiling point is low.

Under such management, after a very little practice and observation, this apparatus yields about three barrels of clean pure alcohol a day, of a strength varying in different parts of the running between eighty-nine and ninety-three per cent, as indicated by Gay Lussac's centesimal alcoholmeter.

The still being charged with this clean pure alcohol, and the purifiers charged with chloride of calcium or quick lime, and a new distillation made, a large portion of the run will, by careful management, be found to be absolute alcohol, containing only traces of the chloride of calcium or lime.

Many details of apparatus and management, as, for instance, means and mode of heating up the water of the tubs at starting, &c., are omitted here as unnecessary to be described. The en-

tire apparatus costs, when complete, from 600 to 650 dollars. It is not patented, and may be seen at any time at the Louisville Chemical Works of T. E. Jenkins & Co.

Louisville, Kentucky, December 1857.

REMARKS ON SOME PHARMACEUTICAL PREPARATIONS.

By John M. Maisch.

In the pharmaceutical laboratory the displacement apparatus is now in constant use for the exhaustion of crude drugs, in preference to the old fashioned way of macerating them for a certain length of time, expressing and obtaining the liquor clear by filtration. It is the convenience of combining all these operations into one, the gain of time and the cleanliness of this manipulation, that have won for it the well merited favor of the pharmaceutist. Some few articles are still considered unfit for this process; on a few of them I offer the following remarks.

Tinctures of Opium.—Of the tinctures containing opium, paregoric is most conveniently made by the process of maceration, inasmuch as all the ingredients are dissolved by the menstruum, except the opium, the quantity of which is so small as not to retard filtration or occasion any loss by it. It is different with the other tinctures of opium, for which an expression of the dregs previous to filtering is directed by the Pharmacopœia. Opium, on account of its gummy nature, when put in a percolator, is apt to pack so tightly and to clog the apertures of the lower end of the apparatus, as to refuse to let any liquid pass at all. This tendency must be obviated if the tinctures of opium are to be made by displacement. After several failures in this attempt I have come to the following arrangement, which answers admirably for the designed purpose.

The lower orifice of a glass percolator is well corked, a cotton plug is inserted into the neck, over which a porcelain diaphragm is placed of about the diameter of the percolator; the diaphragm is then covered with a layer of washed sand, to the thickness of $\frac{1}{4}$ or $\frac{1}{2}$ inch, when the percolator is ready to receive the opium. For making two gallons of laudanum I pour upon 20 oz. Troy of dry opium 1 quart of warm water, work it well occasionally with

a pestle in a mortar, and after macerating it for about twelve hours, mix it with a quart of alcohol; after another twelve hours the liquid is poured off, the pulp placed upon the sand in the percolator, and the liquid added to it; after the pulpy mass has settled, the cork is withdrawn, when the liquid will commence to run slowly, perfectly clear; particles of opium or sand that may have passed the diaphragm being kept behind by the cotton. The vessels that have been used, are washed with diluted alcohol, and the washings put upon the opium for displacement, which process is completed when the obtained tincture measures two gallons. The first half-gallon contains nearly all the strength of the opium operated upon, the liquid afterwards trickles through much lighter, until towards the end of the process it passes colorless. It takes about five days to finish the above quantity of laudanum; one day for maceration, and four for percolation.

Acetated Tincture of Opium may be prepared in a similar manner; for smaller quantities the diaphragm may be dispensed with, the cotton filter is covered with the sand, and after 2 oz. opium have been macerated with 5 oz. of the menstruum for twenty-four hours, the operation is completed as in the former case, the last of the liquid to be displaced by throwing about 2 oz. water on the opium.

In preparing wine of opium the process may be conducted in precisely the same way; in making Sydenham's laudanum, however, I have repeatedly covered the cotton filter with the saffron finely cut, upon which the opium mixed with the cinnamon and cloves was placed, when the whole thus arranged was macerated with about one-fourth the wine for forty-eight hours, and afterwards slowly displaced; the product was always unobjectionable.

With much more accuracy and nicety, than with the process directed by the Pharmacopœia, may the opium be exhausted in a way similar to the above, for the preparation of extract of opium. After the opium, by means of some water and sufficient trituration, is reduced to a pulpy mass, the liquid is poured off, the pulp packed in a percolator prepared as for laudanum, and after the passage of the liquid amounting to the quantity used

for maceration, this is set aside, the opium exhausted by water, and the last obtained liquid evaporated first to a syrupy consistence before the first part is added; thus a complete exhaustion of the opium is made sure of, and the contact of the liquid with the atmosphere avoided as much as possible.

Tincture of Hops.—Hops are too bulky to allow of their being used for the process of displacement without having been previously reduced to a moderately fine powder; this, however, cannot easily be obtained; even well dried hops have a tendency to cake when pounded in a mortar, and to clog the teeth of Swift's drug-mill; but if, as soon as the clogging is perceived, a little fine dry sand is run through the mill, the teeth are cleaned sufficiently, and thus by alternately passing hops and fine sand through, a considerable quantity may be ground with little trouble. After grinding 12 oz. hops, I took the mill apart to clean it, when scarcely one drachm was found sticking between the teeth. Rather less than 3 oz. of sand were found sufficient to aid in grinding this quantity of hops to a pretty fine powder. The powdered hops are put into a percolator, and after having been thoroughly moistened with diluted alcohol, are packed tightly; then 12 oz. do not quite fill the space of three pints. In this state, and mixed with such a small quantity of sand, hops are admirably adapted for the process of displacement, and easily exhausted by diluted alcohol, the last portion of which may be displaced by water, which being retained by the hops in considerable quantity causes them to swell.

Syrup of Citric Acid.—The readiness of this syrup to acquire a more or less disagreeable odor or taste, may be partially due to the changeableness of citric acid in an aqueous solution, though this tendency is counteracted by the sugar; chiefly, however, it must be referred to the oil of lemon used for flavoring, which, by its exposure to the air, may have lost the delicate odor of the lemon peel by oxidation, thus assuming a more terebinthinate smell and taste. This disposition of the artificial lemon syrup to deteriorate, may in a very great measure be obviated by employing an essence for flavoring prepared of 6 oz. of the yellow rind of *fresh* lemons to one pint of 95 per cent. deodorized alcohol. The lemon rind in its fresh state is covered with some alcohol for several hours, when it becomes so friable as to be

easily rubbed into a coarse powder in a wedgewood mortar; it is then extracted in the percolator. Half a fluid drachm of this essence imparts a delicate flavor to one pint of simple syrup acidulated by citric acid.

ON THE GOLD COIN OF THE UNITED STATES AS A MEANS OF ADJUSTING APOTHECARIES' WEIGHTS.

By Wilson H. Pile, M. D.

Several years ago, I procured from the United States Mint, through the politeness of Prof. J. C. Booth, a standard 1000 gr. weight, in order to regulate my 1000 gr. specific gravity bottles, which I had then just commenced to introduce. By means of that standard, and a very delicate balance, I adjusted a complete set of weights, down to the one-hundredth of a grain, which I now use: this by way of preamble.

In the report on weights and measures, read before the American Pharmaceutical Association, (1857,) are the following paragraphs:

"It required but a very superficial examination of the subject, to satisfy your Committee that there existed great inaccuracy and want of uniformity in the weights and measures in use by our dispensing apothecaries; and even where government has undertaken the preparation of their own chemicals, they have not been able to furnish their employees with a standard set of weights and measures for their use, for we believe we have none, or at least not such as are available for chemical uses."

"Having no government standard to which our own manufactures can be brought for a test, and most of the scales and weights in use in this country being of foreign manufacture, this want of correctness and uniformity is an evil, however great, not easily reachable by any means within our individual scope or power."

It occurred to me to test a few of our gold coin, to see how near their actual weight corresponded to the legal weight, and at the same time to ascertain whether the weights which I had myself made, as previously stated, corresponded to those now used in the Mint, where every gold coin is separately adjusted. The result was very satisfactory to me, showing that if we have not a correct theoretical standard of weight, we have, at least, a very practical one, namely, our gold coin, scattered over the whole country and in reach of every one.

I therefore suggest, to the apothecaries in our wide spread Union, the employment of our gold coin as standards by which to regulate their weights, especially those employed in dispensing prescriptions, as they will be found entirely within the limits of the balance generally in use.

The weight of our present gold coinage, as established by law, is as follows:

The	$20 00	gold	piece to weigh	516	troy grains.
"	10 00	"	"	258	"
"	5 00	"	"	129	"
"	3 00	"	"	$77\frac{2}{5}$	"
"	2 50	"	"	$64\frac{1}{2}$	"
"	1 00	"	"	$25\frac{4}{5}$	"

In my trials of the $2\frac{1}{2}$ dollar piece, which I prefer as a standard, I found the actual weights of several of them, taken promiscuously, to be 64.5 grs.; 64.63; 64.43; 64.54; 64.38; 64.37; giving an average of 64.47 grs., which is only three-hundreths of a grain less than their legal weight.

By combining different pieces of gold, the weight being shown as above, the ordinary avoirdupois weight may also be regulated; thus—a 20 dollar piece on one side of a balance, and a 3 dollar piece on the other, would give 438 3-5 grs. difference, being only 1 3-5th gr. heavier than the avoirdupois ounce.

Eighteen dollars and fifty cents in gold should weigh 476.3 grs., or 3.7 grains lighter than the apothecaries' ounce.

The farther application of this subject I leave to those interested.

Philadelphia, Dec., 1857.

ADULTERATION OF VERATRIA.

By John E. Carter.

While performing some experiments recently on commercial veratria, I found the specimen I was operating on only partially soluble in alcohol. This circumstance led to the supposition that the article was adulterated; to confirm this opinion, the following experiments were performed.

A small portion of the suspected veratria was placed on a

slip of platina foil, and heated in the flame of a spirit lamp; it inflamed without previously fusing, and left a large amount of black ash, which, by a continuance of the heat, became nearly white. This ash was almost tasteless, insoluble in water or alcohol, soluble in dilute acids, and on being tested proved to be magnesia.

A weighed quantity of the impure alkaloid was washed with boiling alcohol until entirely exhausted; the residue, when carefully dried, amounted to 38 per cent. of the original weight. Like the ash obtained in the first experiment, it consisted of magnesia.

The veratria experimented with was obtained about fifteen months ago, directly from the manufacturer. A second lot, procured from the same house twelve months later, yielded 36 per cent. of magnesia; but a portion obtained a few days since was apparently free from mineral impurity.

Strychnia and some salts of quinia and morphia prepared by the same manufacturers, were carefully examined, and did not appear to contain any inorganic substance.

It is therefore to be inferred that the presence of magnesia in this instance is due to an accidental circumstance in the process of manufacture, and points a caution to operators who employ a process in which magnesia is used.

Philadelphia, 11th mo. 27th, 1857.

REMARKS ON FLUID EXTRACTS OF ERGOT AND CINCHONA.

By Henry Thayer, M. D.

To the Editor:—The remarks upon these two fluid extracts in the last number of the Journal of Pharmacy, were read by me with much interest, and I am induced to send you an account of my manipulations in preparing them.

By my formula, fluid extract of Cinchona differs from that made by Mr. Taylor's formula, in being a stronger preparation, in containing a less amount of sugar, and a proportion of alcohol, the change being made to secure a solution of the precipitates, a greater degree of permanency, and from a knowledge of

the fact, that a large amount of sugar in fluid extracts sometimes causes nausea in a stomach weakened by sickness.

The manipulations I have adopted are the same in making the two extracts, and a description of one will be a full description of the other.

I take it to be a generally acknowledged fact, that the effects of ergot are best developed when freshly powdered ergot is administered in substance. But this form of the remedy is liable to two objections—the bulk and unpleasantness of the dose, and its liability to lose strength by keeping. The fluid extract is proposed as a form of the remedy which obviates these objections, and that extract which most nearly resembles the raw material, would seem to be the most perfect preparation. As a general principle, I have always believed that extracts should, as nearly as possible, represent the raw material, and that the extract in solution should contain all the principles of the plant, without change by heat, oxygen or chemical agents.

I should define a perfect fluid extract of ergot to be—a permanent solution of the principles of ergot in their original combination, each drop representing one grain of the raw material.

To ascertain the value of diluted alcohol as a menstruum, a portion of ergot having been properly percolated with this spirit was carefully dried, a part macerated in water, a part in alcohol 76 per cent., and a part in ether. On evaporation the water yielded albumen and vegetable matter, the alcohol no appreciable residue, and the ether a small proportion of fixed oil, more limpid than that obtained from fresh ergot, less easily congealed, with no ergot odor, resembling fresh cod liver oil. Diluted alcohol, as a menstruum, has this advantage, that the precipitates which form during evaporation, are easily redissolved when alcohol is added to the extract. The amount of alcohol to be added is lessened by the addition of sugar, which should be placed in the still with the tincture, as it protects the extractive matter somewhat from the effects of heat, and prevents its solidifying on the bottom and sides of the pan. The method I have adopted is based upon the above reasoning.

Reduce to coarse powder 100 pounds of fresh ergot. Place it in a suitable vessel and pour dilute alcohol upon it until covered. As the liquid is absorbed and the mass swells, stir and loosen it

up and turn on more spirit, to ensure a complete saturation. Let it stand four or five days covered. Then transfer to proper percolators, and pack it so closely that percolation shall take place slowly. Continue the process, adding fresh portions of spirit until the strength is extracted. As the tincture is obtained, it should be divided into different portions; that is, the stronger and the weaker tincture are to be kept separate.

The vacuum pan is now charged with twenty gallons of the first or saturated tincture, and fifty pints of alcohol carefully distilled off through the rectifying column, at a heat of 100°. This will be of 88 per cent., or spec. grav. .827. Set this aside for future use. Now withdraw from the still its contents, and having placed in it twenty pounds of sugar, charge it with the last or weakest tincture and proceed with the evaporation, adding the successive portions of tincture, until the whole is reduced to sixty-five pints, which is shown by a graduated scale on the vacuum pan. At the commencement of evaporation, the thermometer will mark 110° of heat, but it gradually rises as the extract acquires consistence, and at the close will stand at 120° to 125°. Add to the contents of the still thirty-five pints of the alcohol first distilled and agitate the liquid until the precipitates are dissolved. Draw out the perfected extract into a close vessel. When cold, stir it well, let it stand a few days, decant and bottle.

In send you a sample of fluid extract of ergot and fluid extract of cinchona made by this process. They have each been bottled about five months. My impression concerning age in fluid extracts prepared by this process, is, that when properly corked, they improve by age, like old wine, "mellowing" without injury to their medicinal effects.

Cambridgeport, Mass., Dec. 7th, 1857.

ON A NEW METHOD OF PREPARING THE COMPOUND SYRUP OF PHOSPHATES.

By Joseph G. Richardson.

Being induced, at the request of a neighboring physician, to attempt the preparation of a syrup of the phosphates of iron, lime, soda and potassa, I was led to a series of experiments, re-

sulting in the production of the following formula for that compound:

℞.	Solution of Persulphate of Iron, U. S. P., (containing ℥iv. in Oj.,) . .	f. ʒx.
	Pyrophosphate of Soda, . . .	℥ss.
	Phosphate of Lime, ...	
	Phosphate of Soda, (rhombic) . .	
	Phosphate of Potassa, of each . .	℈iv.
	Hydrochloric Acid, ...	f. ʒij.
	White Sugar, ...	℥xij.
	Citric Acid, ...	
	Solution of Ammonia, of each, . .	q. s.

Precipitate the solution of persulphate of iron by the pyrophosphate of soda, dissolved in about f.℥viij. of water, wash the precipitate, triturate it with ʒij. of citric acid, and gradually add ammonia, until the liquid becomes clear and slightly alkaline; then dissolve the phosphate of lime in the hydrochloric acid, precipitate by liquor ammonia, filter, wash the precipitate, and while still moist, triturate with ℈viij. citric acid and let stand until it becomes clear: mix with this the above solution of pyrophosphate of iron, neutralize with liquor ammonia and slightly acidify with eight grains of citric acid. Pulverize the phosphates of soda and potassa and dissolve them in this liquid, filter if necessary, add the sugar, whose solution is to be effected by agitation without the aid of heat, and lastly dilute with sufficient water to make the whole measure f. ℥xvj.

As thus prepared the syrup is of a fine light green color, with a saline and slightly aromatic taste, but quite free from the disagreeable styptic astringency of most of the ferruginous compounds: if preferred, it may readily be colored by cochineal, and flavored with a tincture of orange peel, &c.

The chief peculiarity of this process, *i. e.*, the employment of citric acid instead of phosphoric, as a solvent for the phosphate of lime, may prove an advantage as diminishing the cost of the preparation.

Philadelphia, Dec. 1857.

ON CYCLAMEN EUROPÆUM.

By S. DE LUCA.

(Translated from Journ. für prakt. Chem., vol. 71, p. 330. BY WM. T. WENZELL.)

PART I.

The Cyclamen Europæum* is a plant cultivated to some extent in France for its beautiful flowers. The flat bulbous root, which is furnished with blackish rootlets, contains a sugar capable of fermentation, starch, gum, and an acrid poisonous principle. Its juice exhibits an acid reaction, and possesses an extraordinary acrid and strong astringent taste. These properties have induced me to examine the tubers. I shall therefore give in the first part of this treatise a description of the active principle which I separated, and call Cyclamin†. Four kilogrammes of tubers, after washing in distilled water, were sliced and macerated 45 days in 4 litres of rectified alcohol, in a place secured from light. The alcoholic solution was then decanted, the same tubers triturated, again treated in the same bottle with three litres of alcohol, and after a month's time expressed. The residuum, which still possessed a slight acrid taste, was again triturated and treated as above with 2 litres of alcohol, which, after twenty days, was also expressed. The several alcoholic liquids were then united, filtered, and the larger portion of alcohol removed by distillation. The residue, which was gelatinous, was evaporated to dryness in a waterbath, secluded from light, and then succesively exhausted with cold alcohol. The alcoholic liquids obtained were then mixed, filtered, and placed for spontaneous evaporation in a cellar. After forty day's repose, there appeared in the bottom of the evaporating dish a whitish, amorphous deposit in the form of small masses. This was washed several times in cold alcohol and finally dissolved in boiling alcohol. This hot

* The root contains on an average, 80 per cent. of water and yielded 0·8 per cent. of ashes, which, according to Ubaldimi, contained potassa, soda, lime, magnesia, silica, chlorine, sulphuric and phosphoric acids, peroxide of iron, but no manganese or alumina, not even a trace.

† This principle has been long ago discovered by Saladin, and described by him under the name of Arthanitin. (*Annal. de Chem. Med.*, t. vi. p. 417.—*Editor of Journal of Prakt. Chem.*

alcoholic solution deposits Cyclamin on cooling always in the form of small, amorphous, aggregated masses. When desiccated in vacuo over sulphuric acid, in the absence of light, Cyclamin possessed the following properties: It is amorphous, white, inodorous, opake, pulverulent, very light, and neutral in its reactions. In a damp atmosphere it increases in volume by absorbing water. When brought in contact with cold water it assumes a transparent appearance, like pasty jelly. By spontaneous evaporation of a cold prepared alcoholic solution, or by the cooling of a hot solution, it is deposited in the form of small amorphous masses, which are turned brown by the direct action of light. It is very soluble, the solutions frothing like solution of soap and coagulating like one of albumen, at a temperature of 140° to 167° Fahrenheit. After cooling, and three or four days' repose, the coagulum is again dissolved by the liquid in which it was formed, and by the application of heat may again be coagulated. Cyclamin contains no nitrogen. It is soluble in large quantities in hot alcohol, is free of sulphur and phosphorous, and is combustible on platina foil without residue. Its aqueous solution is not colored with iodine, not even after coagulation, nor can it reduce the tartrate of copper and potassa, or ferment when brought in contact with yeast. The aqueous solution of Cyclamin absorbs vapor of bromine quite readily, and forms a coagulum without coloration, unless the bromine is in excess. The action of chlorine is similar. By acting upon Cyclamin with synaptase at 86° to 95° Fah. it suffers decomposition by splitting up; glucose being generated which may be made to ferment with the evolution of carbonic acid and the formation of alcohol, and reduced salts of copper. Acetic acid dissolves it in the cold, and the solution obtained is not coagulable. Hydrochloric acid dissolves it also, but the solution is coagulated at 185° Fah. with the formation of glucose. With concentrated sulphuric acid Cyclamin is colored first yellow and then a permanent violet red. This coloring matter, however, disappears with the immediate formation of a white precipitate on the addition of an excess of water. Bichloride of mercury added to a cold solution of Cyclamin has no action, while gallic acid coagulates it. By nitric acid it is readily acted upon in the cold, the products being acids capable of combination with

alkalies. By using an acid of different strengths, products of a different nature are obtained, and with the aid of heat energetic action is developed. By fusion with potassa, hydrogen is eliminated, while an acid scarcely soluble in water is generated. The taste of Cyclamin becomes, after a few moments, insupportably acrid, attacking the throat. It is soluble with the aid of heat, and without decomposition in glycerine, absolute alcohol, wood spirit and alkalies. It is dissolved in only small quantities by the various alcohols, in the cold. Ether, bisulphuret of carbon, chloroform, turpentine and the essential oils do not dissolve it. The analysis of Cyclamin gave these figures:

	I.	II.
Carbon,	54·55	54·54
Hydrogen,	9·11	9.12

The action of the juice obtained from the tuber of the Cyclamen and that of its principle, is worthy of consideration. The juice administered to rabbits in quantities of from 10 to 20 grams. did not cause the death of the animal. Hogs will eat the tuber with impunity, while, on the contrary, it is poison to small fishes, when they are placed into water containing one cubic centimetre of juice to two or three litres of water. Further experiments were instituted by Bernard. He injected the juice, which had been expressed three days since from two tubers, into the lungs and cellular tissue, in order to determine if the juice's active principle would affect those organs, after the manner of cruari poison. The following results were obtained:

1. By injecting two grms. into the crop of a large green finch, the bird soon expired.

2. By injecting four grms. into the trachea of a rabbit the animal died with convulsions in ten minutes.

3. One gram. of the juice introduced under the skin of a green finch caused death in ten minutes, attended with convulsions.

4. A frog having two grams. of solution placed under the skin, death followed in half an hour. The heart had ceased to beat, the muscles and nerves lost their irritability almost entirely, and the intestines were distended with gas.

These experiments show that the active principle contained in the tuber of the Cyclamen does act upon the animal organism, in a manner similar to the cruari, only less energetic.

The poisonous effects of Cyclamin, like that of the cruari poison, is neutralized to some extent by bromine. To prove this, the following experiments have been tried at the laboratory of Bernard:

1. One cubic centimetre of the aqueous solution of Cyclamin, placed under the skin of a frog, caused death in five minutes.

2. A second frog treated in the same manner, with the only difference of previously saturating the solution with bromine, death only occurred after 3½ hours.

3. Under the skin of another frog two c. c. of Cyclamen juice caused death in twenty minutes.

4. From the same quantity of juice saturated with bromine, death followed in four hours.

Cyclamin resembles albumen by its coagulating properties. By its property of being decomposed by alkalies it resembles mannite, and by the frothing of its aqueous solution when agitated it appears analogous to saponin. In respect to its solubility in water after coagulation, it may be compared with some organic salts of lime. In its action upon the animal organism it resembles cruari, by producing its effects; and lastly, it appears, from its capacity of splitting up, to possess properties which would place it along with salicin and populin.

In Biot's polarizing apparatus, the aqueous solution gives a rotary tendency to the left, but it is feeble. (*Compt. Rend.*, 1857, t. xliv., No. 14, p. 723.)

The Cyclamen Europæum or Arthanita Cyclamen, sowbread, is a tuberous-rooted plant of the genus Cyclamen, order Primulaceæ, sexual system Pentandria Monogynia. The fresh root is considered acrid, drastic, and anthelmintic. It was formerly made into an ointment, "Unguentum Arthanitæ," with other substances, and employed as a purgative, being rubbed on the abdomen. The fresh root has also been administered in one drachm doses.

The wild swine of Italy subsist chiefly upon the tubers of the Cyclamen, hence the name sowbread; French, *pain du porceau.*

ETHICAL ANALYSIS.

By Edward Parrish.

It is by the analysis of material things that we are enabled to classify them according to their composition and uses, and it is only by the proper application of ethical analysis to individuals and to institutions, that their true position in the moral scale can be determined.

Applied to society at large or to its proximate constituents—its industrial, political, reformatory or religious institutions—ethical analysis is the most complex and difficult of studies, and is only within the reach of the experienced and profound, and yet its applications to the individual, and especially to the single incidents of his life, are within the capacity of all who are disposed to use them.

Nothing is more common than criticisms on the public and private course of individuals; this, indeed, constitutes the staple of conversation in what is called society, though the glare of prejudice and the jaundiced eye of envy obscuring the clear light of reason and conscience too often render this ordeal most unjust and injurious. All are ready to pass opinions upon *others*, but how few seek by a close ethical analysis applied to *themselves*, to discover their own secret springs of action, and the bearing of their daily pursuits upon the welfare of those around them and of society at large.

Ethical analysis, like physical analysis, is a close and accurate study, and is especially occupied with details. No vague and uncertain estimates will satisfy its demands; it dissects with unsparing scrutiny the daily and hourly incidents of life, and tearing away the crust of self-complacency, exposes the naked elements of character in their actual proportions to each other.

As atoms constitute the aggregate in physical existence, so do daily thoughts and deeds make up the sum of life and character; and as the forces inherent in material atoms group them into distinctive compounds, having each its peculiar properties and uses, so do a man's motives and aims in life constitute him what he is with all his capacities for good or evil.

A knowledge of the atomic constitution of a body derived from its analysis opens to us its chemical nature, its uses and the

modifications of which its elements are capable; so a man's knowledge of his daily motives and springs of action, derived from a careful ethical analysis, gives him that sense of his own capacities and power of directing them which must be the foundation of every well developed character.

Viewed in this light the practice of ethical analysis becomes an important individual duty, involving first the substantial interests of the individual, and, as a necessary result, the proportionate elevation of the profession to which he belongs and of society at large.

It becomes a duty as much above the mere dissection of a plant or a mineral as is mind above matter, a duty which presses itself upon those who have no time or means to devote to scientific research, equally with the chemist and the man of science; for unlike chemical investigations, it consumes no time which could otherwise be devoted to labor, and calls for no outlay in the purchase of expensive apparatus or materials.

The tests to be applied are within the reach of all; and when the moral nature is kept alive to their influence they are even quicker in their operation than any of the dynamic or chemical forces, and their application, unlike that of chemical reagents, is so obvious and plain, that "the way-faring man though a fool cannot err therein."

Without intending to go into detail in relation to the tests and reagents employed in ethical analysis, we may hint at one or two of the most familiar, before referring to some of the practices of druggists and apothecaries, especially inviting their application.

There is one remarkably comprehensive test given in the great text book of our system of morals which is known to all as the golden rule.

The analyist who would apply this test to many of the common practices of the trade, would perhaps be obliged to condemn as spurious much that passes current in respectable business circles, and would get no more thanks for his pains than a chemist who should rummage our shelves and expose all the adulterations and sophistications that are so willingly concealed. Yet this rule applies so admirably to each individual case of self-examination as to be ever one of the most reliable within our reach.

An efficient instrument, a sort of moral hydrometer, capable of penetrating deeply into an action, and indicating with considerable precision its moral strength, or specific gravity, as it were, is one of the very best appliances for ethical analysis. A well educated and sensitive conscience is such an apparatus; but unfortunately this most important instrument is, by a false or careless adjustment and graduation, too often rather a measure of the external pressure, the influence of fashion, or of a misguided public sentiment, than a true measure of moral rectitude and high principle.

One of the most useful methods of physical analysis is that which indicates the nature of a substance by studying its effects upon other substances, called reagents, and the modifications to which it is subject by contact with these. This method applied to ethical inquiries, though difficult, is one of the most instructive. Actions in themselves right are never incompatible with each other; they have always a favorable effect upon the integrity of the individual; they improve and elevate his instincts and affections, and put him in harmony with the good and the true, and thus strengthen him for an upward and onward course through life. On the other hand, wrong-doing is at war with the best interests and highest enjoyments of life, and is degrading and weakening in its effect upon character.

These facts, so obvious in regard to clear instances of virtue and vice, are too little applied to those complex and remote effects of human actions which grow into established abuses and sometimes into legalized crimes.

The profession of pharmacy, in common with all others, abounds with illustrations of this remark.

As far as it lays claim to rank among liberal professions, it must possess higher principles of action than pertain to most of the mercantile and industrial pursuits. Although like all industrial occupations it has for its active principle the potent element of acquisitiveness, yet this must be materially modified in its characteristics by benevolence and conscientiousness, by the love of knowledge for its elevating and humanitarian uses, by an honest desire for reputation and for fame—motives which it is well to keep before men in all departments of labor, but

which especially belong to the professions connected with the cure of disease and with the preservation of the public health.

How far we are individually or in a collective capacity sustaining the position thus claimed, is a legitimate subject for ethical analysis; and without assuming any censorship over my fellows, I propose to the tyro a few questions bearing on this general enquiry.

1st. Has a druggist or apothecary, who makes profession of being a practical pharmaceutist, and offers his services to the public as such, a moral right to neglect the opportunities of scientific and practical improvement within his reach?

2d. Has a pharmaceutist, who has discovered an improvement in pharmacy, calculated to affect the health and consequent welfare of the community and the advancement of the science or art of pharmacy, a moral right to keep it a secret for his own private advantage?

3d. Has a pharmaceutist, who receives a lad into his shop as an *eléve* or apprentice, a right to neglect his thorough education in the practice of the art, and as far as in his power in the sciences pertaining to it?

4th. Is it morally right for a pharmaceutist, who has the confidence of the poor and ignorant of his neighborhood, to take indiscriminately their hard earnings in exchange for the costly and often worse than useless medicines, which, through the public press, are plausibly and insidiously recommended to them? Does not such an one participate in the moral obloquy which among enlightened and conscientious people attaches to the charlatan and quack?

5th. How far is it the duty of the pharmaceutist, in the sale of stimulant and narcotic agents, to interfere for the prevention of their intemperate use?

6th. What are the true ethical limitations to the rule of trade, "to buy cheap and sell dear;" and how far are pharmaceutists justifiable in following this maxim in the purchase and sale of the peculiar and highly important articles of their commerce?

7th. To what extent is competition allowable in conducting the drug business, and what are the duties of pharmaceutists to each other and to the public in regulating and modifying the retail prices of medicines?

From the Proceedings of the American Pharmaceutical Association—1857.

THE PRODUCTION OF LEECHES IN MICHIGAN.

By Frederick Stearns.

The great cost of imported leeches, and their liability to accident and disease, have proved a serious drawback to their general use in this country, more especially in interior towns and cities, where the delay incident to transportation is another objection to the purchase and sale of them by the pharmaceutist.

I believe that large dealers in leeches in the country confine themselves solely to the importation of those of foreign collection, and that our indigenous varieties, some of them valuable, are entirely neglected.

I desire to call the attention of the Association to the fact, one proved by an experience of twenty years that by means and appliances so simple as to commend them to pharmaceutists in every part of our Union, we may insure to ourselves an abundant and cheap supply of these invaluable animals.

The foreign varieties of leeches can be easily naturalized, and the supplies of those *indigenous varieties* found valuable, can be indefinitely increased.

The idea of growing leeches in the State of Michigan was first carried out by a member of the medical profession, who moved there from New York city some twenty years ago, while that portion of his adopted State was yet a wilderness. Feeling the want of leeches which he had freely used in his eastern practice, he was led to experiment with those found in the neighboring marshes, with indifferent results. He finally procured in New York a lot of Spanish leeches, and, building a tank for them, had the satisfaction of seeing them thrive admirably, and to this time has produced them in larger quantities, sufficient to supply the practitioners of his portion of the State. The "Hirudo decora," a leech found abundantly in some parts of Pennsylvania, was in this way introduced, and is now largely used in some counties of the State.

The "aquarium" required consists of a wooden tank eight feet long, six feet wide and four feet deep; this is set into the ground near a running stream of water, a portion of which is conducted into and through the tank, its entrance and exit being made through wire cloth to prevent the escape of leeches. The bottom of the tank, to the depth of eighteen inches, is covered

with cobble stones, in order to afford a refuge for the leeches. The water exit is placed about ten inches below the top edge of the tank, which edge has a rim of boards projecting inwards, all the way around nailed to it. This is all the apparatus required, and they need but very little attention. A few frogs thrown in once a week will supply five thousand of them with food sufficient. In winter they become torpid, and the tank is allowed to freeze over and so remain till spring.

They produce their eggs during the months of June and July, and the leech is matured in about two years. Their age when subject to ordinary care is about fifteen years.

When applied they bite readily, and draw about two drachms of blood, the flow of which, however, is to be excited in the usual ways.

Those parts to which leeches are to be applied should be well cleansed from smell or perspiration, and they are best used by putting the requisite number into a suitable sized cupping glass partly filled with water, and applying the edges of the cup closely to the part to be leeched; after they have taken hold, the cup may then be gently removed.

The naturalized leech is hardy, rather small, (from one to two and a half inches long,) and very active; those produced from the variety brought from Pennsylvania (a specimen of which is herewith submitted) are of a velvety olive green color upon the dorsal surface, with three longitudinal rows of spots; the centre one orange colored, the others black; the belly is of a rusty orange spotted with black.

The grey leech of Michigan, the best of those indigenous to the State, is of a uniform grey color, extremely thin or flat, peculiar in its motions, is with difficulty induced to draw, though its bite is unaccompanied with any pain; the eggs of the leech, instead of being left to take care of themselves, as in the case of the other leeches, are attached to the belly, as are the young leeches for some time after their development.

The low price at which these leeches can be produced renders their aid available to the poorest; and while by cheapening them, they are, by increased demand, rendered a greater source of pecuniary profit, they will cost the producer nothing but a little time and patience.

From the Proceedings of the American Pharmaceutical Association—1857.

A NEW METHOD OF PREPARING SOLUTION OF CITRATE OF MAGNESIA.

By Frederick Stearns.

In this method a freshly prepared solution of bi-carbonate magnesia, of known strength, is employed, which is converted into the citrate by the addition of the requisite amount of citric acid, and at the moment of corking, that the large amount of carbonic acid gas then liberated may be preserved. It is as follows:—Precipitate magnesia from a hot solution of sulphate of magnesia by adding to it a hot solution of carbonate of soda; it requires 10¼ pounds (troy) of sulphate of magnesia to 12 pounds (troy) of carb. soda.

Wash the precipitated magnesia well upon a linen filter, drain, and having ascertained the amount of water contained in a sample of known weight, by drying and calcining, introduce the moist hydrate into a suitable apparatus; and to every 1,280 grains of anhydrous magnesia the moist hydrate contains, add one gallon of clean soft water, (allowing, of course, for the water already mechanically combined with the hydrate,) then subject the whole to the action of carbonic acid gas under a pressure of ten atmospheres for twenty-four hours, or until the magnesia is dissolved. Having drawn it off, filter and prepare the solution of the citrate as follows:—Introduce into twelve ounce strong bottles ten and one half fluid ounces of the solution and one and a half ounces of lemon syrup, not acidulated; and having the corks ready and softened, introduce into each three hundred and sixty-six grains of citric acid in crystals; cork and wire immediately.

The large excess of carbonic acid which this solution contains, renders its use more agreeable than when prepared after the officinal or usual methods. I have not found it to deposit the insoluble citrate.

From the Proceedings of the American Pharmaceutical Association—1857.

NOTE ON THE TREE PRODUCING QUILLAIA BARK.

By Charles Raymond.

The following account of "soap bark" originally published in the "*Bullein de la Société Impériale Zoologique d'acclimation*,"

was condensed in the "*Journal de Pharmacie*," of September last, by M. Leon Soubeiran, from whose paper we translate. The information is valuable as some have attributed this bark to a tree growing in the West Indies.—(ED. AMER. JOURN. PHARM.)

The Quillaia, (Quillaia saponaria,) is a tree, indigenous to Chili, South America, where it occurs in mountainous districts in dry and rocky soils, where it rains but ten or twelve days in the year; it is the last large forest tree that is observed on the Cordilleras which remain part of the year covered with snow. It retains its leaves in winter; they are of medium size, thick and glossy and beautifully green. I do not know the color or shape of the flowers, not having had an opportunity of seeing the tree during its flowering season; its seed are contained in cellules forming a kind of rosette.

The liber of this tree, deprived of the rough exterior bark, is an article of commerce in Chili, where it may be found in all the shops, and large quantities are exported from Valparaiso to other places along the west coast of South America.

This bark is used for washing silk and linen stuffs, which it does without injury to their colors, but principally to wash the head once or twice a week, which is said to be the cause of the beauty and good condition of the hair of the men, and women especially, of all classes of society. In employing the bark they bruise it between two stones, and let it macerate in water exposed to the sun, express the dregs, and use the infusion for washing the article.

As a therapeutic agent I have heard it spoken of as a febrifuge. They employ it in colds in the head, an affection very common in Chili from their prolonged exposure to the sun; they inhale the dust caused by agitating the broken up bark, which produces a great deal of sneezing. I tried this treatment on one occasion, but to me the remedy was worse than the disease.

The principal substance contained in this bark is saponin. It is many years since it was sent to France from Valparaiso, but I do not know why it has not been subjected to trial. In Chili and on all the west coast of South America, it is an article of daily consumption.

The wood of this tree is white and hard, it is employed in the construction of houses, for which purpose its good qualities are appreciated, and it is also used for fuel and for making charcoal.

According to Molina the name of this tree is derived from the Chilian word *quillean*, which signifies to wash. The wood is very hard, and as it does not easily split, it is used by the peasants to make stirrups, but the chief value of the tree is due to its bark. The latter is received in bales by way of Havre from Valparaiso and Lima.

GLEANINGS—MEDICAL, PHARMACEUTICAL AND CHEMICAL.

Syrup of Borax.—M. Trousseau recommends this syrup in laryngeal catarrh. His formula is, borax four drachms, simple syrup ten ounces, (dissolved with aid of heat.) A teaspoonful is to be taken from seven to ten times a day, swallowed without dilution, and avoiding to drink immediately after so as to prolong the contact of the remedy.—*Boston Med. Journ.*

Saccharine Protosulphate of Iron.—M. Latour recommends that 300 grains of pure protosulphate of iron be mixed with 80 grains of sugar candy dissolved in a gill of water, and left to crystallize at the temperature of 95° to 100° Fahr. The crystals are oblique rhomboidal prisms, keep without alteration if well dried at first, and contain 54.57 per cent. of the sulphate of iron.—(*Ibid.*)

Preservation of Vaccine Virus by Glycerin.—Dr. Andrews, of Chicago, Ill., has ascertained that glycerin will preserve vaccine virus in an active condition. The scab broken into pieces is thrown into a vial with a little glycerin and occasionally shaken. Dr. Andrews vaccinated seven cases without a single failure, with the liquefied virus that had been kept through the warm weather. If the preservative action of the glycerin should prove to extend indefinitely it will greatly increase the facility of vaccination. Dr. Johnson, who makes the communication to the *Peninsular Medical Journal*, examined the mixture microscopically and found the cells perfectly preserved.

Therapeutical use of Iodate of Potassa.—Messrs. Demarquay and Gustin suggest the use of the *iodate* instead of the chlorate of potassa in affections of the mucous membrane wherein the latter has been used. It is said to act quicker, more energetically and

in smaller doses. The dose varies from gr. v. to gr. xx. "In diphtheritis, in mercurial stomatitis especially, and in a case of gangrenous stomatitis," its efficacy was prompt. The authors think that the alkaline iodates and bromates, owing to their peculiar action will prove valuable agents in the cure of pseudo-membranous affections.—(*Revue Therapeutique.*)

REFORM IN WEIGHTS AND MEASURES.*

By Frederick Stearns, Pharmaceutist.

"In order to secure the greatest amount of convenience and utility in calculations connected with commerce, it is self-evident that the SCALE OF NOTATION, the SCALE OF MONEY, and THAT OF WEIGHT AND MEASURE, SHOULD BE BASED UPON ONE COMMON PRINCIPLE. OUR MONEY SCALE, like the SCALE OF NOTATION, IS ALREADY on the DECIMAL PLAN, and the last-named is so firmly established throughout the civilized world as to be unalterable; and all that remains for us is to make the scales of weight and measure harmonize with it."—*Report of M. Lefferts to the New York Chamber of Commerce.*

The necessity for a reform in our present standards of weight and measure—a reform based upon the adoption of the decimal system—is admitted by every one whose business transactions compel them to employ those now in use. More particularly is it felt by the compounder and prescriber of medicine, and especially by the pharmaceutist; for he buys and sells by one standard of weight, compounds and dispenses by another, purchases liquids by standards perhaps legal only in the place of purchase, sells them by that one which is legal in his own State, while he dispenses them as medicine by yet another one.

The initiatory steps towards this reform have been taken by various scientific societies and commercial associations, in appointing committees to consider upon the best means of securing a decimal arrangement, applied to the scale of weight and measure, and to endeavor to find one practicable in its adaptability to the wants of commerce, and available in the ease with which

*[NOTE.—It had been our intention to reprint the Report of Dr. Guthrie, on Weights and Measures as published in the Proceedings of the Association, but the views of Mr. Stearns, as to the unit of a new decimal system of weights being a *troy grain*, being in our opinion more practicable, we have concluded to insert his paper; which, besides being more condensed, explains the nature of Mr. Felton's views as contained in Dr. Guthrie's report. See Editorial remarks in this number.—EDITOR AMER. JOURN. PHARM.]

it may be made to supersede the present standards, by not involving too wide a departure from present well-known quantities.

From several reports which I have read, it appears that a plan proposed by Mr. J. F. Felton, of New York, is recommended—one which is the result of 17 years labor in this hitherto unfruitful field, and to which, in its general principles, I give my unqualified admiration. But as the adoption of any new system is worthy of previous careful consideration, and it is incumbent upon all who feel interested in the subject to give their views, if differing from those offered the public, the writer is led to submit the following remarks in regard to the UNIT proposed in the plan alluded to.

Mr. Felton proposes, in his plan, not to disturb the most important commercial weight now employed—the avoirdupois pound of 7000 grains—but to adopt it as the unit in his new system, and to create the scale by decimal divisions and multiples of this weight, using in the scale names now employed for nearly similar weights.

The three orders of weight—Troy, Apothecaries (the pound in each being 5760 grains,) and Avoirdupois (the pound being 7000 grains)—he supersedes by the establishment of one, the scale as follows:

				EQUIVALENT IN PRESENT STANDARDS.
		1 grain	=	7-10 of 1 grain.
10 grains	=	1 scruple	=	7 grains.
10 scruples	=	1 dram	=	1 1-6 drachms Apoth.
10 drams	=	1 ounce	=	1 ounce 3 dr. 2 sc. Apoth. 1 ounce 262.5 gr. Avoir.
10 ounces	=	1 pound	=	1 pound Avoirdupois.
10 pounds	=	1 stone	=	5-7 of 1 stone.
10 stones	=	1 hundred weight		less than cwt. by 12 lbs.
10 hundred weight	=	1 ton		" ton by 1240 lbs.

In the above scale, it will be seen that the pound (commercial) alone remains unchanged—the grain being reduced to the ten-thousandth part of the pound, or seven-tenths of the present grain.

Now, I differ from Mr. Felton in regard to the practicability of adopting the Avoirdupois pound as a unit, and propose, in place of it, the grain now employed; because, while I admit that the Avoirdupois pound may be the most important weight of our standards in ordinary commercial transactions, yet I believe, if the present arrangement is to be disturbed at all, and

one be adopted similar to Mr. Felton's, that the standard grain, the present *unit*, should be the unit in the new system—

First—Because it is alike in all the systems we employ, while the Avoirdupois pound is the pound of no other scale used in this country.

Second—I believe the grain to be the most important of the divisions of weight which we employ, on account of its use in estimating the power and effect of remedies—it being a guide in prescribing and dispensing;—and upon it and other attenuated weights are constructed all our medical formulæ.

Third—I consider that, by employing the grain for the unit, the reduction of the old systems to the new one is much easier, being easily made without the use of written figures,—in fact, by a method which Mr. Felton has pointed out, reduction is almost done away with—which method does not apply to his scale with equal facility.

Here is the scale, with the standard grain for a unit:

				EQUIVALENT IN STANDARD WEIGHTS.
		1 grain	=	1 grain.
10 grains	=	1 scruple	=	½ scruple (Apoth.),
10 scruples	=	1 dram	=	1⅔ drachms (Ap.), 1 dr. 2 sc.
10 drams	=	1 ounce	=	2 ounces 2 scru. Apoth. 2 ounces 125 grs. Avoird.
10 ounces	=	1 pound	=	1 lb. 8 oz. 6 dr. 2 sc., Apoth. 1 3-7 pound Avoird.
10 pounds	=	1 stone	=	1 stone 2 6-7 lbs. Avoird.
10 stones	=	1 hundred weight		excels cwt. by 30 6-7 lbs.
10 hundred weight	=	1 ton		less than ton by 811 3-7 lbs.

In the above scale, the pound contains 10,000 standard grains, instead of 10,000 grains of the value of only seven-tenths of the present standard—which I am led to believe just as practicable for commercial purposes, and much more available for ours. Reference to the following table shows the relation between the different scales:

SCALE OF STANDARD WEIGHTS.		EQUIVALENT IN POUND-UNIT SCALE.		EQUIVALENT IN GRAIN-UNIT SCALE.
1 grain	=	1.3 grains	=	1 grain
1 scruple, Apoth.,	=	2 6 scruples	=	2 scruples
1 drachm, Apoth.,	=	7.8 scruples	=	6 scruples or .6 of one dram.
1 ounce, Apoth.,	=	6 dr. 2.4 scrup.	=	4 dr. 8 scrup., or 4.8 dr.
1 ounce, Avoir.,	=	5 dr. 68.75 grains	=	4 dr. 37.5 gr.
1 pound, Avoir.,	=	1 pound	=	5 oz. 7.6 dr.
1 pound, Apoth.,	=	7 ounces 4.88 dr.	=	7 ounces, or .7 lbs.
1 stone	=	1.4 stones	=	9 lbs. 8 oz., or .98 stone.
1 cwt. (112 lbs. Av.)	=	1.12 hund. weights	=	7 stones 8.4 lbs., or .784 cwt.
1 ton (2240 lbs. Av.)	=	2.240 tons	=	1 ton 5 sto's 68 lbs, or 1.568 tons

It will be seen that the reduction of the attenuations of the standard weight into the grain-unit scale is unattended with the inconvenient fractions which accompany that of the pound-unit scale.

Moreover, *if any quantity of Avoirdupois, Troy or Apothecaries' weight be reduced to grains, the figures which express that number of grains show the number of any denomination of the grain-unit standard contained in that quantity.* Thus, 37 pounds, 11 ounces, 7 drachms, 2 scruples and 14 grains (Apoth.) is equivalent to 218,874 grains, either of the Troy, Apothecaries, Avoirdupois or grain-unit standard. Now, this can be read, by the decimal arrangement of the grain-unit scale:—2 stones, 1 pound, 8 ounces, 8 drams, 7.4 scruples; or 21 pounds, 8 ounces, 8 drams, 7.4 scruples; or 218 ounces, 8 drams, 7.4 scruples; or 2,188 drams, 7.4 scruples; or 21,887.4 scruples.

In order to reduce, as above, the standards now employed to the pound-unit scale, when the numbers indicate a quantity of a division less than the pound Avoirdupois, that quantity must first be reduced to grains, and then be converted into grains of the pound-unit scale, by adding to each 3-10 of a standard grain.

It is evident that, in employing a *decimal* arrangement of the scale, the reduction of a quantity of one division to that of another becomes a nullity, when it is remembered *that the figures used to express any quantity show the number of any denomination contained in that quantity*, as shown by the example given above.

Having shown why it appears to me that Mr. Felton has overlooked the importance of the standard grain, in pharmacy and medicine, in his desire not to disturb the current of commercial transactions, and considered the advantages afforded by the grain-unit decimal scale, let us look at the system of Measure of Capacity, in his plan.

He takes one-eighth of the New York dry bushel for the unit of measure; this contains ten pounds, Avoirdupois, of distilled water at 60° F. This unit he terms a gallon—corresponding with the "stone" of the pound-unit scale of weight. The divisions and names in the scale are as follows:

10 grains	equal	1 scruple.
10 scruples	"	1 dram.
10 drams	"	1 gill.
10 gills	"	1 pint.
10 pints	"	1 gallon.
10 gallons	"	1 anker.
10 ankers	"	1 tun.

—thus making the pound-unit scale to equal, in distilled water at 60° F.,—

1 grain	equals	1 grain.
1 scruple	"	1 scruple.
1 dram	"	1 dram.
1 ounce	"	1 gill.
1 pound	"	1 pint.
1 stone	"	1 gallon.
1 hundred weight	"	1 anker.
1 ton	"	1 tun.

Now, to establish a similar uniformity between the standard of measure and the grain-unit system, it requires that we should have a minim measure, corresponding in distilled water at 60° F., with the weight of the grain, and that this minim be the unit for measure—the scale and names as follows:

		IN WEIGHT.		IN MEASURE.
1 standard grain	=	1 grain	=	1 minim.
10 standard grains	=	1 scruple	=	1 fluid scruple.
100 "	=	1 dram	=	1 fluid dram.
1,000 "	=	1 ounce	=	1 fluid ounce.
10,000 "	=	1 pound	=	1 pint.
100,000 "	=	1 stone	=	1 gallon.
1,000,000 "	=	1 hundred weight	=	1 anker.
10,000,000 "	=	1 ton	=	1 tun.

It is an advantage to have the number of divisions in the scale of measure correspond with the number of those in the scale of weight, and that the corresponding divisions of both should *weigh* alike in water, from the fact that most liquids in common use—milk, wine, oil, etc.,—are of nearly the same specific gravity as water at its ordinary temperature—near enough for commercial purposes,—while expensive liquids, of varying specific gravity, and powerful liquid medicines, should be bought and sold by *measure* only. It will be noticed that, in the last table, the minim is preserved in the scale of measure and made a fraction over .5 of a grain heavier than the standard minim (Apoth.) while, in the previous one the drop or minim is discarded. I deem the minim an important item in the scale of measure; and, when made to correspond with the grain in weight, quite as appropriate to adopt for a unit of measure as the eighth

part of the New York dry bushel—which bushel is not a standard in many other States.

The following table shows the relative value of Apothecaries' and minim-unit standard measures, in distilled water at 60° F.:

1 minim	=	.9493 of 1 minim.
1 fluid drachm	=	.569 of 1 fluid dram,—about 5.7 scruples.
1 fluid ounce	=	.455 of 1 fluid ounce, or 4 dr. 5.5 scruples.
1 pint	=	.7291 of 1 pint, or 7 fluid oz. 2 fluid dr. 9.1 scr.
1 gallon	=	.58328 of 1 gallon, or 5 pints 8 fl. oz. 3 dr. 2.8 scr.

—and, by comparing the following table of Apothecaries' measure—

		1 minim	=	.9493 grains.
60 minims	=	1 fluid drachm	=	56.9 "
8 fluid drachms	=	1 fluid ounce (480 m.)	=	455.6 "
16 fluid ounces	=	1 pint (7680 m.)	=	7291.1 "
8 pints	=	1 gallon (60,440 m.)	=	58328.8 "

—with that given, with the liquid grains for a unit, the contrast shows the glaring ununiformity of the latter and the simplicity of the other.

Now let us see the beautiful uniformity of correspondence between the systems of decimal weight and measure, and our present currency—taking for example an article, liquid or solid, valued at one dollar per ounce.

1 grain,	or	1 minim	costs	1 mill.
1 scruple,	or	1 fluid scruple,	"	1 cent.
1 dram,	or	1 fluid drachm,	"	1 dime.
1 ounce,	or	1 fluid ounce,	"	1 dollar.
1 pound,	or	1 pint,	"	1 eagle.
1 stone,	or	1 gallon,	"	10 eagles.
1 hundred weight,	or	1 anker,	"	100 eagles.
1 ton,	or	1 tun,	"	1000 eagles.

I would, in conclusion, refer those interested in this much-needed reform to the sources which have led to the foregoing remarks—the report of M. Lefferts to the New York Chamber of Commerce, and that of Dr. Guthrie to the American Pharmaceutical Association. These contain—together with matter not appropriate for comment in a paper of this kind—interesting historical information, and many unanswerable arguments in favor of the early introduction of the decimal arrangement into our scales of weights and measure.*—*Medical Independent*, December 1857.

* [See vol. ii (July and Oct., 1830) of this Journal for an admirable paper on the Weights and Measures of England and France.—EDITOR.]

AMYLENE CONDEMNED AT THE ACADÉMIE DE MÉDECINE, PARIS.

M. Giraldès having recently sent a paper to the Academy, entitled, "Clinical Study of Amylene," MM. Robert, Larrey, and Jobert formed the committee to which it was referred. In the report read on the 18th inst., M. Jobert details various experiments and observations he has since made with this substance, both with and without apparatus; and he comes to the conclusion that amylene exerts an energetic and dangerous influence. The statement that has been made, that it is less active than chloroform, is only true when it is administered in the open air, and is explained, he says, by the rapidity of its evaporation. If only a sponge be employed, there are only produced, after a period varying from nine to nineteen minutes, muscular agitation and acceleration of pulse, effects that ensue in from five to seven minutes if the sponge be placed in a cone of pasteboard. If an apparatus be employed, however, amylene becomes a most energetic anæsthetic, the desired result occurring in two, and often in one minute. The effects of this agent are the increase of the number of the pulse by thirty or forty, the modification of the color of the blood, and the perturbation of the nervous system, inducing insensibility, coma, and the abolition of the intellectual power. It is thus a toxical agent, acting simultaneously upon the vascular and nervous systems. M. Giraldès does not advance sufficient proof that amylene is less dangerous than chloroform; and even M. Robert's proposition of employing it in certain exceptional cases is not admissible, inasmuch as amylene possesses the inconveniences, without the advantages, of chloroform. Chloroform does not, like amylene, deprive the blood of its red color; and while chloroform depresses and renders the pulse slower, amylene quickens it, producing congestion of organs. Amylene is of difficult administration, while chloroform is easily given. Chloroform has furnished to M. Jobert the same satisfactory results at all ages, and he believes that it is not more injurious in infancy than at a later period. He proposed that the conclusions of the author in favor of amylene should not be received; but as the communication is interesting in other points, the thanks of the Academy should be returned for it.

M. Velpeau proposed a further condemnation of amylene on the part of the Academy; for, from the experiments even of the reporter, it was evident that amelyne is more difficult to manage, and more dangerous in its results. In the recent case of death from it, there were not the extenuating circumstances adduced for chloroform or ether, such as the want of skill or experience of the manipulator, since it was the inventor himself who directed the procedure. "I maintain that a substance which in so short a time, and in the hands of him who recommends it, is dangerous to such a point, ought not to be permitted to be employed; and I propose that the Academy formally reject it."

M. Larrey observed that he completely agreed with M. Velpeau, and he should have thought that M. Giraldès, after having been present at Dr. Snow's last accident, would have somewhat modified his ideas upon the subject.

M. Jobert added, that when amylene is administered on a sponge, anæsthesia sometimes cannot be produced for half or three-quarters of an hour. If Charrière's apparatus be employed, it is rapidly induced; but at the expense of serious accidents. It differs from chloroform, in that the insensibility it induces is instantaneous and not progressive. It produces an important modification of the blood.—*London Pharm. Journ., Oct.* 1, 1857, *from Moniteur des Hôp., No.* 100.

ON THE EMPLOYMENT OF THE LIVING ELECTRIC FISHES AS MEDICAL SHOCK MACHINES.

By Prof. G. Wilson.

The author stated that, in prosecuting researches into the early history of the electric machine, he did not at first contemplate going further back than the seventeenth century, or commencing with any earlier instrument than Otto Guericke's sulphur globe of 1670. His attention, however, had been incidentally directed to the employment of the living torpedo as a remedial agent by the ancient Greek and Roman physicians; and he now felt satisfied that a living electric fish was alike the earliest and the most familiar electric instrument employed by mankind. In proof of the antiquity of the practice, he adduced the testimony of Galen, Dioscorides, Scribonius, and Asclepiades, whose works

proved that the shock of the torpedo had been used as a remedy in paralytic and neuralgic affections before the Christian era. A still higher antiquity has been conjecturally claimed for the electric Silurus, or Malapterurus of the Nile, on the supposition that its Arabic name, *raad*, signifies thunder-fish, and implies a very ancient recognition of the identity in nature of the shock-giving power and the lightning force; but the best Arabic scholars have pointed out that the words for thunder (*raad*) and for the electric fish (*raâd*) are different, and that the latter signifies the "causer of trembling," or "convulser;" so that there are no grounds for imputing to the ancient Egyptians, or even to the Arabs, the identification of Silurus-power with the electric force. In proof of the generality of the practice of employing the living zoo-electric machine at the present day, the author referred to the remedial application of the torpedo by the Abyssinians, to that of the gymnotus by the South American Indians, and to that of the recently-discovered electric fish (*Malapterurus Beninensis*) by the dwellers on the old Calabar River, which flows into the Bight of Benin. The native Calabar women are in the practice of keeping one or more of the fishes in a basin of water, and bathing their children in it daily, with a view to strengthen them by the shocks which they receive. These shocks are certainly powerful, for living specimens of the Calabar fish are at present in Edinburgh, and a single one gives a shock to the hand reaching to the elbow or even to the shoulder. The usages referred to appear to have prevailed among the nations following them from time immemorial, so that they furnish proof of the antiquity as well as of the generality of the practice under notice. The author concluded by directing the attention of naturalists to the probability of additional kinds of electrical fish being discovered, and to the importance of ascertaining what the views of the natives familiar with them are in reference to the source of their power and to their therapeutic employment. Sir J. Richardson stated that there were not less than eleven genera of fishes known that had the power of giving electric shocks. There was one peculiarity in all these fishes, and that was the absence of scales. In every one of them an apparatus had been discovered, which consisted of a series of galvanic cells put in action by a powerful system of nerves. He

read extracts from a letter from Dr. Baikie, now engaged in exploring the Niger, in which that gentleman stated that he had met with an electric fish in Fernando Po, and which Sir J. Richardson believed was identical with the Malapterurus, which had been described by Dr. Wilson, from the coast of Old Calabar. The natives called this fish the Tremble-fish.—*London Pharm. Journ. October* 1857.

RESEARCHES ON THE DIFFUSION OF FLUORINE.

By M. J. Nickles.

From the whole of my researches, the following conclusions may be drawn:—

I. Fluorine exists in the blood, in very small quantities.

II. There is also some in the urine.

III. There is also fluorine in the bones, but much less than has been said; according to Berzelius, 100 grammes of the earthy matter of the bones contain 3 grammes of fluoride of calcium; with the new means of investigation which I make known, we find that there is scarcely 5 centigrammes of this fluoride in 1 kilogramme of osseous substance.

IV. The sources from which the animal organism derives the fluorine which it may require, are

1. Drinkable waters.

2. Vegetable substances.

Both contain it in such small proportions that it is necessary, in order to obtain traces of it, to operate on, at least, I kilogramme of ash and on the product of the evaporation of several quarts of water.

3. Accidentally, also, the organism may derive fluorine from mineral waters, all of which contain fluorides in very considerable quantity as compared with drinkable waters.

4. This circumstance appears to explain the efficacy of certain mineral waters, containing only a small quantity of mineral matters, such as the waters of Plombieres, Mont-Dore, Soulzbad, &c.

5. The water of the Seine taken at Paris, and the water of the Rhine taken at Strasbourg, are those which contain the least fluorine.

6. The river water in France richest in fluorides, is that of the Somme, taken at Amiens.

7. The various mineral waters are not equally rich in fluorides; the richest of those which I have examined, are: the water of Contrexéville, Antogast, and Chatenois (Bas-Rhin).

One litre of these waters is sufficient for giving unequivocal marks of the presence of fluorine.

8. On the contrary, sea water (Atlantic) contains it only in proportions detectable in 300 litres. This fact establishes a very decided difference between this water and the mineral waters which are analogous to sea water.

9. The law of the diffusion of fluorine in the earth's crust may be formulised thus: there is fluoride of calcium in all the waters which contain bicarbonate of lime; there may also be fluorine in the rocks and minerals which are formed by the way of sediment.

With regard to the manner of putting these facts in evidence, it results from what is said in the memoir, that:—

10. The classical process sins in two especial points, and leads us to admit the existence of fluorine where there is none; this is owing:—

A. To the action which sulphuric acid may exert on the glass plate.

B. To small quantities of hydrofluoric acid which this acid may contain.

11. I eliminate these causes of error:—

A. By replacing the glass plate by a place of rock crystal.

B. By employing an acid free from hydrofluoric acid.

12. The acid employed by preference for decomposing the fluorides, is sulphuric acid purified by diluting it with water, and exposing it for some time to a temperature of 150° to 180° (302° to 356° F.)

13. The solvent which I employ is hydrochloric acid, which, with some care, may be found free from fluorine in commerce.

My memoir makes known the circumstances in which such hydrochloric acid is produced in the large way.

14. All the estimates of fluorine heretofore made with the aid of sulphuric acid, should be repeated.

15. Many substances are reputed to contain fluorine without containing any: the fluorine which has been found in their products of decomposition, has been introduced by the reagents, and especially by the sulphuric acid employed.—*London Chemist, November* 1857, *from Comptes Rendus.*

ON SEVERAL PHARMACEUTICAL PREPARATIONS OF CINCHONA.

By T. R. Spence, M. D., Pharmaceutist, of Detroit.

Considerable attention of late, has been given by pharmaceutists, to the fluid extract of bark, and several formulas have been published. I propose the following process, which produces an elegant and efficient preparation.

Fluid Extract of Cinchona.

Take of Calisaya Bark, coarsely powdered, four lbs. avoird.
Dilute Alcohol, ... eight pints.

Macerate the bark with a portion of the alcohol, in a closed vessel, kept in a hot water bath for 24 hours. Transfer to a displacing apparatus, pour on the remainder of the menstruum and pass it slowly through twice. Continue the displacement, with dilute alcohol, until completely exhausted, and remove the first quantity (eight pints) when recovered. Evaporate this, by means of a water-bath, to six pints, and the second quantity, in like manner, to four pints, and add together. Allow it to remain quiet for about two days—decant and filter, and dissolve in it

Refined Sugar—four lbs. avoird.

Collect the precipitate of cinchona red, and resinous matter, and dissolve in it

Alcohol—one pint—

which is to be added to the extract gradually, with agitation. I recover the alcohol used by distillation, which is an important consideration, in an economical point of view, though not at all essential to the process.

It will be readily seen, that the first portion of the tincture must be exceedingly rich in the soluble principles of the bark, and that the slight amount of heat required in the evaporation cannot deteriorate it in the least.

The tincture which follows, secures the complete exhaustion, and containing much less of the extractive matter, can be evaporated more safely.

The precipitate of cinchona red, and resinous matter, which is discarded in most formulas, or only partially incorporated, is of particular importance; and the presence of the small amount of alcohol renders less sugar necessary, for preservation, than would otherwise be the case.

Each fluid-ounce will represent one half an ounce of the crude material (which is the proportion recognized in most of the formulas I have seen;) medium dose, one drachm.

The fluid extract is advantageously used, also, in the preparation of the infusions, and decoctions,—and in addition to other mixtures.

The following articles I have manufactured for some time, and they have met with a favorable reception from many :—

Tincture of Calisaya—Aromatic.

℞. Calisaya Bark, coarsely powdered, one lb. avoird.
Ceylon Cinnamon, . "
Cardamom Seeds, . "
Jamaica Ginger, . " of each 1½ drs.
Purest deodorized Spirits, five pints.
Macerate and displace, and add—
Sherry Wine, ... two pints.
Tincture Angelica, . . . one fluid-drachm.
Simple Syrup, . . . one pint.
Allow it to stand a few days, decant and filter.
Dose—one half to one table-spoonful.

This is an efficient preparation, and pleasantly taken.

Wine of Peruvian Bark.

℞. True Red, or Calisaya Bark, well bruised, six oz.
Sherry Wine, ... four pints.

Macerate, displace, and after standing a few days, decant and filter.

Dose—one-half to one wine-glassful.

It may be sweetened to suit the taste, when taken. This was intended as a substitute for the wine and bark so frequently used, and possesses the advantages of elegant appearance, with equal and determinate strength.—*Medical Independent, Sept.*, 1857.

METHOD OF DETERMINING THE QUANTITY OF MORPHIA IN OPIUM.

By M. Fordos.

The determination of the quantity of morphia in opium is a subject of very great interest in a medical point of view. It is to the presence of this alkaloid, endowed with very energetic action on the animal economy, that opium owes, if not all its properties, at least those for which it is chiefly used in medicine. The opiums which are found in commerce have a very variable composition. The quantity of morphine may vary from nothing to 14 per cent., and even beyond that in indigenous opium. It will therefore be seen what uncertainty is involved in the employment of this substance, if the proportion of morphia be not determined previously to its use in pharmaceutical preparations. A great number of processes for its analysis have been published, but they all present practical difficulties, which prevent our always arriving at a satisfactory conclusion.

This question has been made the subject of a prize by the Belgian Academy of Medicine.

The process which I am about to describe for ascertaining the quantity of morphia, is easily performed, and furnishes results which are very accurate.

Fifteen grammes of the opium, cut in thin slices, are macerated in sixty grammes of water, occasionally stirring the liquid. After twenty-four hours the product of maceration is turned into a mortar, and the opium thoroughly disintegrated with the pestle. The whole is then poured on a small filter, and, after the liquid has run through, the filter is washed with fifteen grammes of water, which have also served to rinse the mortar and flask in which the maceration was performed. The washings are repeated a second and third time with ten grammes of water each time. The opium is then sufficiently exhausted. A third part of the liquid is taken for determining the quantity of ammonia necessary for the precipitation of the morphia. The ammonia is added drop by drop, using a graduated burette, and stopping the moment the liquid presents a slight ammoniacal odor. The quantity of ammonia employed is then noted down.

The quantity of morphia is determined in the remaining two-thirds of liquor, which represents ten grammes of opium.

To the liquor is added an equal volume of rectified spirit and a quantity of ammonia, exactly double that used in the first experiment. (It is necessary to add a slight excess of ammonia, to obtain the complete separation of the morphia.) The liquid is then agitated, and allowed to stand in a well-closed flask. It soon deposits crystals, some in fine needles, very little colored, which is narcotine; the others in prisms, more bulky, and a little more colored, are morphine. After two or three days the flask is well agitated, and allowed to stand again for some hours, to give the morphia time to precipitate completely. The crystals are then collected upon a small filter, and washed with about half an ounce of proof spirit. This washing removes the mother-liquor and the coloring matter. There remain on the filter crystals of morphine, which are slightly colored, and crystals of narcotine, which are colorless. The filter is dried upon the same funnel, two or three drachms of ether added, and, after that, three or four drachms of chloroform at twice. The crystals of narcotine instantly dissolve in the chloroform, and are removed with it. The chloroform does not affect the morphia. The filter is finally washed with three drachms of ether, to remove the last traces of chloroform and narcotine, and then dried. The crystals of morphia, which are removed with great facility, are weighed.

In the process which I have just described, in treating the opium with water, all the morphia which exists in combination is easily dissolved with very little narcotine and a little resinous and coloring matter. If ammonia be added to the aqueous solution, a dirty precipitate is obtained of morphia, narcotine, and coloring matter. The addition of the alcohol retards the precipitation of the alkaloids, and gives them time to assume the crystalline form. The alcohol also retains in solution the resinous and coloring matter. Nearly colorless crystals are therefore obtained.

Washing the morphia with chloroform is a very simple operation, which completely separates all the narcotine.—*London Pharmaceutical Journal, November*, 1857.

PRODUCTION OF PHOSPHORUS, GLUE, AND CHLORIDE OF AMMONIUM.

Hr. Gentele suggests that the production of phosphorus, which has within the last few years become so much more important a branch of chemical industry, may be advantageously combined with the production of glue, sal ammoniac, and ferrocyanides.

The raw materials for the preparation of ferrocyanide are to be charred in the ordinary manner, and the liquid as well as solid carbonate of ammonia, obtained at the same time, is to be used for making sal ammoniac.

The separation of the fat from the bones is effected best by boiling them with water. The fat thus obtained serves for making soap. The bones are from time to time taken out of the water by means of rakes, and fresh bones put in until the liquid becomes gelatinous. This may, according to circumstances, be used as manure, or as food for pigs.

The phosphate of lime is then separated by digesting the bones in hydrochloric acid (1·03 to 1·05 sp. gr.) until they become soft and transparent. Fresh bones yield the largest amount of fat and also of gelatine; in old bones the gelatine is for the most part decomposed. Even in fresh bones the amount of gelatine varies very much, some containing 45 per cent., and others only 30, or even less.

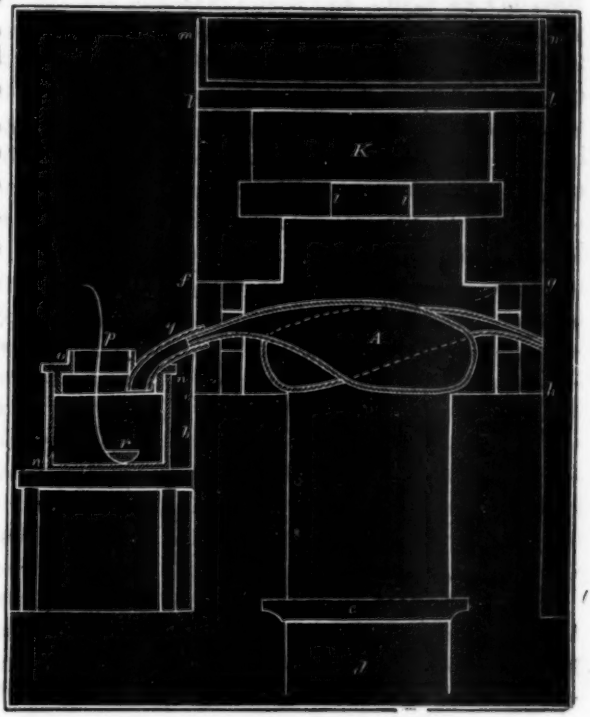
The bones from which phosphate of lime has been extracted by hydrochloric acid must be well washed with water, and lastly with lime water. The gelatinous residue is dried in the air, and then exposed to the action of steam in a well closed vat, furnished with one or more perforated false bottoms. After a short time, a stream of liquid gelatine flows out of the vat, sufficiently concentrated to be run into moulds and cut into sheets. When a more dilute solution begins to flow off, the remaining lumps of gelatine are taken from the vat and boiled with the thin solution, or with water, until completely dissolved, the liquid evaporated, and run into moulds.

For obtaining phosphate of lime and sal ammoniac two methods may be adopted: The solution of phosphate of lime in hydrochloric acid may be precipitated by the crude solution of carbonate of ammonia, obtained from the charring of the raw

materials used for the production of ferrocyanide. When the precipitate has subsided, the solution of chloride of ammonium is drawn off, and a fresh quantity of the hydrochloric solution precipitated in the same vat. After repeating this operation several times, the precipitate is washed with water to remove the whole of the chloride of ammonium, and then mixed with some of the hydrochloric solution of phosphate of lime, so as to separate the carbonate of lime mixed with the phosphate. It is, however, preferable to precipitate the phosphate of lime by means of lime milk, because the hydrochloric solution of phosphate of lime is very dilute, and in the evaporation of the dilute solution of chloride of ammonium in iron pans the salt is rendered ferruginous, and the pans are eaten away. But when the solution of chloride of calcium obtained in precipitating the phosphate solution by lime milk is used for converting the carbonate of ammonia into chloride of ammonium, the solution may be evaporated in iron pans without detriment. The precipitation of the carbonate of lime should be effected with hot liquids, so as to insure the complete precipitation of the lime. Effervescence takes place on mixing the liquids, because the carbonate of ammonia solution contains more carbonic acid than is equivalent to the calcium of the chloride of calcium. The phosphate of lime obtained by precipitating the hydrochloric solution with milk of lime contains animal substance. It is dried in porous vessels, and then gently ignited in a reverberatory furnace until it becomes white. In this state it is better adapted for the preparation of phosphorus than burnt bones, on account of its being more easily decomposed, and as it does not contain carbonate of lime there is a proportionate saving of sulphuric acid.

The decomposition of the phosphate of lime by sulphuric acid is effected in the usual way. The separation of the phosphoric acid solution from the gypsum is effected in leaden vats with perforated bottoms, covered with layers of quartz fragments and sand. After the acid solution has filtered off, the residue of gypsum is washed by displacement with water. The phosphoric solution thus obtained is evaporated in leaden pans, heated by the flues leading from the distillation furnaces. The concentrated residue of the phosphoric solution, when mixed with charcoal, is dried in iron pans, covered with a stone vault, with open-

ings in front, for charging the pans and stirring the contents, and with flues at the back, communicating with the chimney, for drawing off the vapors of sulphuric and sulphurous acids. The retorts used for distilling the phosphorus are similar to those used for distilling sulphuric acid from sulphate of iron. They are made of fire clay, about eighteen inches long, and four inches wide in the bulb. The furnace used for the distillation is likewise constructed in the same manner as the Saxon furnaces for distilling sulphuric acid. Each furnace holds twenty-four retorts, at distances of four or five inches apart. In the section *A A'* are the retorts; *b b*, the lateral walls of the fireplace; *c*, the grate fire bars; *d*, the ash pit; *f g h e* are openings throughwhich the retorts are introduced. They are afterwards closed with loose stones, covered with mortar at the outside only, so that they may be removed without injury to the furnace.



A slab of sandstone, *i i*, covers the fireplace, and has square holes through which the flame passes to the iron plate, *l l*, upon which the leaden evaporating pans rest. At the back of the furnace the channel *K* is connected with the chimney, and the draught is regulated by a damper.

The receivers used are made of ordinary clay with lead glaze, and consist of two parts: a cylindrical vessel, *n n*, and a lid, *o o*, with an open neck, *p*, and a tube, *q*, four or five inches long, of such diameter as to receive the neck of the retort, and extending below the under surface of the lid, so as to dip into water contained in the cylindrical vessel. These receivers are cheaper than those made of copper, which are soon destroyed by the action of the hot phosphorous vapor, and the gases generated in the operation.

When the retorts have been arranged in the furnace, and the receivers charged with water connected, the fire is kindled, and very gradually increased during six or eight hours. During this time, water and sulphurous acid vapors are given off, and when combustible gas begins to issue from the retorts, the connection with the receiver is made tight with loam, leaving a very small hole for the escape of gases. An iron ladle, *r*, is then placed in each receiver, and the heat is raised sufficiently to carry on the distillation of the phosphorus. The progress of the distillation is best observed by raising the iron ladles from time to time, emptying their contents under the water in the receiver, and again replacing them, so as to catch the phosphorus as it comes over. During the whole operation combustible gas issues from the small hole in the luting, and burns with a blue flame. When this evolution of gas ceases, it may be owing to a stoppage in neck of the retort, by the deposition of oxide of phosphorus. In this case the receiver must be removed, and a stout iron wire passed up the neck of the retort. When the neck of the retort is found to be clear, the stoppage of the gas must be owing to the retort being cracked.

After the heat has been maintained for forty-six hours, and finally raised to near whiteness, the quantity of phosphorus that passes over decreases so much, that it is not worth while to continue the operation. The receivers are then removed, and the phosphorus emptied into a vat under water. When the furnace has cooled, the retorts are taken out, and a fresh charge introduced. Each retort contains about seven or eight pounds of the dry mass, and yields eleven or twelve ounces of phosphorus. During the whole operation the water in the receivers must be kept cold, without leaving the lower mouth of the tube *g* uncovered.

The improvements that still remain to be made in the preparation of phosphorus, relate only to the distillation. The cost of the material prepared for distillation does not amount to one-fourth the price of the phosphorus it yields, while the cost of the distillation amounts to one-half the price of the phosphorus. Hr. Gentele is therefore of opinion that there cannot be any advantage in attempting to prepare phosphorus with a mixture of charred bones, ($2\ CaO,\ PO_5$,) carbon, and silica, because a much higher temperature is requisite; and to obtain a given quantity of phosphorus from this mixture, containing less than one-third as much phosphorus as that generally used, a very much larger consumption of fuel would be necessary.

The chief disadvantage of the present distillation method, consists in the circumstance that the furnace cannot be worked continuously, and therefore attempts should be made to effect the distillation in larger retorts, which, like those used for distilling zinc by the Altenburg method, may be emptied and charged without interfering with the fire. If this were effected, it is probable that there would be a saving of one-half the fuel at present used, and one cylinder would work as much of the mixture as a whole furnace does now; and although this alone would very materially reduce the cost of production, yet it would be necessary to increase the size of all the other parts of the plan, and this could not be done at a factory without a certain prospect of their being a demand for the increased supply.

The crude phosphorus, obtained as above described, is purified by distillation from a large cast-iron retort, the neck of which only just dips into water, contained in a flat earthen pan, which is so full, that as phosphorus distils over, some of the water runs over the edge.

The phosphorus to be distilled is cut in pieces under water, mixed with some wet sand, and put into the retort in quantities of ten or twelve pounds. The wet sand serves to prevent the ignition of the phosphorus while charging the retort. The application of heat to the retort requires great caution. In the first instance the water adhering to the phosphorus evaporates, and drives out a portion of the air, then bubbles of gas issue, which sometimes ignites when escaping from the water, and, lastly, drops of phosphorus pass over, and condense in the neck

of the retort. From this time the heat must be kept up uniformly, until no more phosphorus comes over; since, if the heat is allowed to decrease, air or water may get into the retort, and give rise to explosions. During the distillation, the water in the receiver is kept cold, and the phosphorus is removed from time to time by an iron ladle; so that in the event of an explosion, phosphorus may not be ignited and thrown about.

For obtaining the phosphorus in the shape of sticks, the ordinary vessel is used for melting the phosphorus; but in the cock is cemented a glass tube, several feet long, and of uniform bore. This is closed at the lower end with a cork, to which a wire is attached, and the glass tube is surrounded by a vessel containing cold water. The cock of the vessel containing the melted phosphorus is then opened, so as to admit the phosphorus into the glass tube, and when it has solidified, the cork is carefully withdrawn, and with it the rod of phosphorus, while fresh liquid phosphorus passes into the tube. By a little management the whole of the phosphorus may thus be drawn out in one stick, and coiled round in the tube, or cut with scissors under water. If the stick should happen to be drawn out too quick, before the phosphorus in the tube is solidified, the cock must be shut, the phosphorus that escapes put back into the melting vessel, and the operation recommenced as in the first instance.—*London Pharm. Journal.*

ON IODIDE OF ALUMINUM.

By R. Weber.

Wöhler has shown that iodide of aluminium cannot be prepared by the same method which Oerstedt in 1820 obtained the chloride, and Löwig subsequently the bromide of aluminum, namely, by mixing alumina with charcoal and igniting the mixture in a current of chlorine or bromine.

By treating metallic aluminum with iodine, the author has obtained iodide of aluminum, $Al^2 I^3$. Some filings of aluminum were placed in a glass tube about 7 centimetres in length closed at one end; dry iodine was then put in and the tube sealed with the lamp. It is advisable to employ 1 part of aluminum to 10–11

parts of iodine. At the ordinary temperature the combination perhaps only takes place slowly; the iodine in contact with the aluminum soon adheres slightly to the walls of the tube, and separates therefrom when struck, leaving behind a brown spot.

If the tube be now carefully heated, the combination is affected with a strong evolution of light and heat; the granules of aluminum burn in the tube with a beautiful violet light; the iodide of aluminum formed constitutes on cooling a solid mass, with a strong brown color from the presence of iodine. If a slight excess of aluminum were employed, all that is necessary is to heat the tube again gently, especially at the point where the metal was placed, and to drive the iodine there by the flame so as to free the compound from excess of iodine; the compound then appears mixed with aluminum as a dingy white crystalline mass.

The iodide of aluminum thus prepared may easily be collected at the end of the tube; the tube is then bent by the lamp, (or a bent tube may be employed from the commencement), and the iodide of aluminum is heated, when it fuses, soon boils, and sublimes in delicate snow-white laminæ into the cold part of the tube.

The iodide of aluminum thus separated from free iodine and the excess of aluminum forms dazzling white crystalline laminæ, which fuse into an extremely liquid fluid, boiling readily when further heated. On cooling it forms a solid, white, radiately crystalline mass. In the air the compound fumes strongly, and deliquesces into oily drops by attracting water; it soon colors paper purple-red, and dissolves in water with a strong evolution of heat. When heated in the air, it is decomposed very readily; iodine separates under these circumtances, so that is scarcely possible to transfer it when fused from one tube to another without alteration, as the mass is always colored brown by some separated iodine. If a few granules of aluminum be put into the second tube and first heated, the whole amount of free iodine is absorbed, and the compound may then be again obtained perfectly white. Analysis gave—

			Average			
Iodide of silver	2·611	2·545	2·947, or I	93·20	3	93·10
Alumina	0·203	0·199	0·231, or Al	7·12	2	6·90

Iodide of aluminum behaves exactly like the chloride. It dissolves in water with strong evolution of heat, forming a fluid which rapidly becomes brown in the air. It is also soluble in absolute alcohol.

The aqueous solution may be evaporated *in vacuo* over sulphuric acid, and under certain circumstances a perfectly white mass may thus be obtained. The iodide of aluminum is treated with little water so as to produce a clear oily solution; this is then quickly placed under the bell of the air-pump, and as complete a vacuum as possible is produced. A radiately crystalline film is soon formed, and in a short time this becomes an enamel-like mass. When touched with a glass rod, the mass which is still tenaciously fluid, then often solidifies with a distinct evolution of heat. The solid mass remains without alteration under the bell-glass with sulphuric acid; it does not fume in the air, deliquesces readily, and dissolves without residue in water. When heated in a glass tube it is decomposed; water, hydriodic acid, and free iodine are evolved, leaving alumina in the residue. It is therefore probably a hydrate of the periodide; the author proposes to determine its composition more exactly.

Iodide of Potassium and Aluminum, $KI+Al^2I^3$, is produced when iodide of aluminum in the form of vapor is brought into contact with heated iodide of potassium in a sealed tube. This compound has the appearance of a waxy, transparent, crystalline mass, which fuses readily, but appears to be very difficult to volatilize. It is not decomposed by being strongly heated, but only parts with a small excess of iodide of aluminum with great difficulty; for this purpose the temperature must be raised until the softening of the glass. In water it dissolves without residue, producing much heat. Analysis:—

I	88·59	4	88·42
Al	5·26	2	4·77
K	5·76	1	6·81

Chem. Gaz., Oct. 15, 1857, *from Poggendoff's Annalen.*

ON A NEW METHOD OF FORMING AMMONIO-IODIDES OF METALS.

By the Rev. J. B. Reade.

It is only within the last few years that the attention of chemists has been directed to the compounds of metals with iodine and ammonia. The fifth edition of Brande's *Chemistry*, published in 1841, is silent on the subject. At the Oxford Meeting of the British Association, in 1847, I exhibited the ammonio-iodide and per-iodide of gold, and since that time other experiments on other metals have furnished me with results which perhaps may be of some interest to the Chemical Section.

Solution of Iodine in Ammonia. Perhaps the best mode of dissolving iodine in ammonia for the purpose in question, is to place about 50 or 60 grains of iodine in an evaporating dish, hold it over the spirit-lamp till thoroughly warm and the vapor arises, and then add a few drops of liquor ammoniæ, which will be immediately charged with a large excess of iodine in solution. This may be poured into a bottle and more iodine and ammonia added, until the requisite supply is obtained.—*Ammonio-iodide of Gold.* Gold-leaf when placed in the iodine solution instantly turns black, (a purple if the solution is diluted), and immediately dissolves, like sugar in water. If left to evaporate spontaneously in some quantity, we obtain black four-sided prisms of the ammonio-periodide, which readily dissolve in water; and if a very weak solution be exposed for some months to the direct action of the sun's rays, a slight precipitate appears, and a drop or two of the clear solution furnishes a most striking microscopic object both as to crystalline arrangement and richness of tint when placed in polarized light.—*Ammonio-iodide of Silver.* Gmelin says of the ammonio-iodide of silver, that "unfused iodide of silver absorbs with evolution of heat 3.6 per cent. of ammonia, and forms a white compound, which on exposure to the air gives off ammonia and turns yellow again." The phenomena are far more interesting when silver leaf is added to the ammonia solution of iodine. The metallic silver is dissolved, and when a few drops are placed on a slip of glass beautiful brushes of prismatic crystals shoot out in all directions, which may be mounted as a microscopic object in Canada balsam after the excess of iodine is spontaneously evaporated. Under polarized light the colors

of the crystals are brilliant in the extreme.—*Ammonio-iodide of Mercury.* The phenomena in forming this compound are varied and interesting. Mercury is added to the iodine solution, and after the application of heat and the addition of a little water, a few drops on a slip of glass give bundles of permanent prismatic crystals, similar to those of silver, and acted on with the same energy by polarized light. If ammonia be added to these crystals, they are immediately covered with tufts of snowy whiteness, and by degrees they are converted into ruby-colored hexagonal prisms, which are also permanent.—*Ammonio-iodide of Cobalt.* Brande observes that "no precipitate is produced in solutions of cobalt either by hydriodic acid or iodide of potassium, or by iodic acid or iodate of potassa." I find, however, that cobalt yields to the action of the ammonio-iodide solution after some hours' digestion and a little heat and water. As might be expected, it exhibits very strongly the sympathetic properties of the chloride, for when placed on paper and gently heated it becomes a brilliant green, which of course vanishes as the paper cools.—*Ammonio-iodide of Titanium.* As titanium, which resists every direct method of attack in the laboratory, yields after a period of digestion in the iodine solution, it is probable that other of the scarcer metals, which are with difficulty reduced by the ordinary methods, might be exhibited in the form of ammonio-iodides, and thus throw additional light on their respective equivalents. The crystals of ammonio-iodide of titanium which I have obtained were from a pure specimen of the metal obtained by Mr. Waterhouse, of Halifax, from the slag of the neighboring iron-furnaces at Low Moor.—*Ammonio-iodide of Aluminum.* In forming this compound I did not, as on other occasions, use the pure metal, but alumina only, precipitated in the usual way. After allowing the alumina to digest for some time in the iodine solution, the whole was boiled in a little water, which dissolved the new compound, and upon evaporation and the proper measure of heat to volatilize the excess of iodine and ammonia, a white semi-metallic substance remained, as in the case of silver. It is soluble in dilute hydrochloric acid, and yields a blue precipitate on the addition of yellow prussiate of potash. Whether any use can be made of this process towards obtaining the pure metal is of course a problem for practical men.—*London Pharmaceutical Journal, October*, 1857.

ON THE DETECTION OF STRYCHNINE.

By Richard Hagen.

The author has investigated this subject in the laboratory and under the guidance of von Gorup-Besanez. He was induced to this by the statements of von Sicherer, that the well-known reaction with bichromate of potash and concentrated sulphuric acid fails when the strychnine is mixed with tartrate of antimony or tartrates in general, or with free tartaric acid.

He first ascertained that the reactions with bichromate of potash, or ferridcyanide of potassium and concentrated sulphuric acid, and with peroxide of lead and sulphuric acid containing nitric acid, never fail when pure strychnine is employed, whether by itself or mixed with a large quantity of sugar, if proper care be taken; this is particularly important, as these reactions have been described as uncertain by incompetent persons in various medical journals. He then passed to the testing of some salts of strychnine.

I. With nitrate of strychnine the reaction with bichromate of potash or peroxide of lead and concentrated sulphuric acid, occurs just as distinctly and persistently as with pure strychnine.

II. This is also the case with muriate of strychnine, with which the characteristic color even appears to be more beautiful than with pure strychnine or the nitrate.

III. Acetate of strychnine also gives the above mentioned reactions with equal distinctness.

Mixtures of pure strychnine and tartrate of antimony in various proportions were tested with bichromate of potash and sulphuric acid.

a. Of a mixture of equal weights of strychnine and tartrate of antimony, weighing 2 grs. in all, a fourth part was put into a watch-glass, and treated with 4 or 5 drops of concentrated sulphuric acid; the whole was then worked into a uniform mass by means of a small pestle. On the addition of a drop of a moderately concentrated solution of bichromate of potash to this mass, a very beautiful bluish-violet stripe was immediately formed around it. On moving the watch-glass to and fro, the coloration spread through the whole mass, and increased in intensity on the addition of another drop of the solution of bichromate of

potash; the reaction persisted as long as with pure strychnine, the blue color gradually passing to violet and then to red.

b. With a mixture of 1 part by weight of strychnine with 10 parts of tartrate of antimony, the reaction occurred just as rapidly and certainly, and persisted nearly as long as with the preceding mixture.

c. With 1 part of strychnine and 20 parts of tartrate of antimony, the reaction lost somewhat in duration, but not in certainty and beauty.

d. With 1 part of strychnine and 30 parts of tartrate of antimony, the duration of the reaction was plainly diminished; it nevertheless occurred quite distinctly. Towards the end of the reaction the mass acquired a greenish tinge.

With a mixture of 1 part of strychnine with 60 parts of tartrate of antimony, the reaction was still distinctly recognizable by a practised eye, but disappeared very rapidly, the fluid acquiring a greenish color. The same result was obtained with mixtures of tartaric acid and strychnine.

From these experiments it appears that this reaction for strychnine is one of the most sensitive with which we are acquainted, and that von Sicherer's statements must be founded in error. As, however, it could not be supposed that they had no foundation in fact, the author tried mixtures of salts of strychnine with tartrate of antimony in various proportions. He obtained the following results:—

With an intimate mixture of 1 part of nitrate of strychnine and 20 parts of tartrate of antimony, the reaction with bichromate of potash and sulphuric acid does not occur; the mass almost instantly acquires a green color. But up to these proportions the reaction occurs even here.

With muriate of strychnine, the reaction is still recognizable with mixtures of 1 part of the salt with 30 parts of tartrate of antimony. This is the case also with acetate of strychnine.

The reaction for strychnine with peroxide of lead and sulphuric acid is not in the least affected by the presence of tartrate of antimony, other tartrates, or free tartaric acid, whether pure strychnine or its salts be employed in the experiments. The reaction occurs with perfect certainty with proportions of 1 to 60; the author considers pure sulphuric acid to be preferable to that containing nitric acid, when tartrates are present.

From these experiments it appears that the presence of tartrates, tartrate of antimony, or free tartaric acid with pure strychnine, does not affect the reaction with bichromate of potash and sulphuric acid ; but that it becomes less sensitive with nitrate of strychnine, and fails altogether with an excess of tartrate of antimony. The probable reason of this is, that the nitric acid set free by the action of the sulphuric acid decomposes the tartaric acid, giving rise to products of decomposition which exert a violent reducing action upon the chromic acid.

On the other hand, the characteristic reaction is produced with perfect certainty by peroxide of lead and sulphuric acid, even in the presence of tartrates, although nitrate of strychnine be employed.

As a matter of course, when in judicial cases nitrate of strychnine and tartaric acid coexist in the substance to be investigated, by the employment of the process of Stass, the strychnine is obtained as such, and not in the form of a salt, so that the above facts would have no influence upon the result. In examining a powder consisting of nitrate of strychnine and tartrates, the nitrate must be converted into pure strychnine, or the reaction with peroxide of lead and sulphuric acid must be employed; this, indeed, should be preferred in all cases when there are no data regarding the nature of the substance under investigation.—*London Chem. Gaz., October* 15, 1857, *from Liebig's Annalen, August* 1857.

CHINESE POISONS.

By D. J. Macgowan, M. D., Ningpo.

[The writer of the following has resided in China, engaged in medical practice, during the last thirteen years. His extensive acquaintance with the Chinese language, and with the literature of Chinese science, is such as to justify confidence in the accuracy of his statements.—Ed. *Edinburgh Medical Journal.*]

In consequence of the atrocious attempt of the Cantonese to poison the foreign community at Hong-Kong, applications have been made to us from various quarters for information on poisons known to the Chinese. An investigation of Chinese toxicology would require much time and special study, which we despair of

being able to devote to that interesting subject. In default of presenting anything of value to the scientific inquirer, we submit for the perusal of the general reader the limited information we possess on Chinese poisons. From the period of the Han dynasty to the present day poisoned arrows have been employed both in the chase and in warfare; less, however, by the Chinese proper than by the so-called Aborigines, or Miautsz. In the hands of the latter they are formidable weapons. Instant death is inevitable from the slightest abrasion. The Chinese possess no agents for counteracting the poisons of the hill tribes; the *Pun Tsau* states that these Inner Barbarians apply borax sometimes with success to poisoned wounds; and it is commonly reported that for their various virulent poisons they possess perfect antidotes.

We are acquainted with only one of the *inoculating* poisons of the Chinese—a watery extract of the root of *tsau-wú*—a perennial creeper found on the hills of the central provinces. Its botanical character, as well as its precise physiological action, we have yet to ascertain. Its active principle appears to be highly volatilizable, and great exactness is needed in preparing it. Small animals are kept in readiness for testing the strength of the extract: they are punctured with a point charged with the poison; and when its virulence is sufficient to occasion instant death, it is boiled no longer. A native physician who saw it prepared by the hunters of the adjacent district of Funghwa, states that sometimes they prick their arms to let blood flow to the wrist, and, after carefully wiping the part near the wound, apply some of the pasty extract to the lower end of the line of blood, which it rapidly blackens through its whole length; and it is affirmed, that were the continuity with the incision unbroken, the morbific action of the subtile agent would penetrate the wound and prove quickly fatal. It is sometimes applied to the tongues of the unwary as a practical joke—when it occasions a keen sensation of formication. The dried root is administered where the nerves of motion are impaired. The Funghwa hunters traverse in winter the mountainous regions of Chihkiang in pursuit of tigers, that are sometimes taken by being pierced with arrows, the necks of which are bound with filaments of cotton saturated with the poison; at other times, springs, charged with

these arrows, are adjusted near the lair of the animal for his destruction. When a limb is struck, the beast writhes awhile before expiring, but when wounded in the body, he leaps forward, staggers and falls dead immediately. Attached to the imperial body-guard is a corpse of hunters, who, when on the chase in pursuit of edible game, provide themselves with envenomed missives to be employed against wolves.

Latterly, poisoned arrows have fallen into comparative disuse as implements of war, owing to an increasing familiarity with fire-arms. We are acquainted with the contriver of a machine which was designed to be used against the English during the late war. It succeeded so well in picking off goats which were led over the cords communicating with it, that the military commission strongly recommend its adoption for destroying barbarian bipeds. Unfortunately for the patriotic inventor, the treaty of Nanking caused the dispersion of the game, just as it was, as he supposed, about to be largely bagged. It need hardly be added that, in the hands of assassins, this easily obtainable poison would prove a potent means of destruction; as a slight puncture of an instrument charged with it, would, from its rapid absorption, be a sure *coup de grace*.

It is not our purpose to point out all the virulent agents which unscrupulous Chinamen are likely to employ against an enemy. We shall only add one more of the inoculating class, and that chiefly on account of its novelty. When the late commissioner Lin was devising means for the extirpation of English barbarians at Canton, some of the gentry of that city actually proposed to H. E. to rid the place of certain prominent and obnoxious individuals by infecting them with *leprosy*. Lin indignantly rejected the proposition as unbecoming a civilized people. That Chinese statesman was a brave and honorable man; his present Manchu successor has no claim to such virtues. His chief objection to the use of leprous virus would be, it is said, the tardiness of its action; it is believed that more than a month elapses after the introduction of the animal poison, before it begins to show itself in its victim. Our knowledge of this foul malady is too imperfect to justify us in pronouncing such an inoculation as impracticable.

There are poisons also which are *inhaled*. A person, who

aided a magistrate in the administration of a poison of this class, gives the following narrative of the transaction, which was a *filicide*. (Our apology for coining this word is, that it is needed to denote a crime, or rather extra-judicial practice, not uncommon in China: resorted to for making away with dangerous adult sons.) The son of that officer was a lawless and incorrigible character, who by misdemeanors perilled the safety of his family, and they determined on his removal. To effect that object without publicity, no small finesse was requisite on the part of his father and friends. Suspecting their designs, he became excessively wary. On the day agreed upon for his execution, the father feigned to be withholding the son's much loved opium, until he could induce the hapless youth to take a draught of tea, which he was artfully led to suppose was drugged. At length, affecting to be wearied by the son's contumacy, the father gave him his opium pipe, mixing with the genial papaver another drug intensely venomous. After a few inhalations, the victim fell into a stupor, which was followed by convulsions, to which his athletic frame succumbed in less than six hours. Lest it be thought that, in publishing an account of this smokable poison, we are fulminating an insidious "counterblast" against tobacco, we would state that few except the mandarins are in possession of the secret; or, if there is no comfort in that to the lovers of cheroots, we add, that, unlike arsenic, this noxious agent renders dying tolerably easy.

To the same class belong those drugs which are employed by burglars for stupifying the inmates of the house to be robbed. Ever since we read in Commissioner Lin's anti-opium diatribe, references to medicines used by robbers, kidnappers, and sorcerers, which that statesmen compared to the prohibited narcotic, we have been vainly endeavoring to investigate their nature. There is, however, abundant evidence that such agents are employed to induce stupor for criminal purposes.

Kidnapping male children for sale in Siam or the Straits has long been a common practice on the seaboard, and, a short time since, to meet the demand for Chinese females in Cuba, many girls were kidnapped. The provincial capital, Hangchau, was thrown into consternation in consequence of the paucity of slave labor in the West Indies. Popular placards and official procla-

mations were posted everywhere, warning the inhabitants against the villanous agents of foreign barbarians, who were prowling in search of female children. Two miscreants were detected with their little prizes, and immediately beaten to death. From the documents published on that occasion, it appears that, for very young children, a drug is employed, which, on being applied to the face, produces a degree of insensibility enabling the operator to lead the little one away unresistingly. For those of a larger growth, as well as for adults, something is given, which, by irritating the throat, causes aphony. At other times they seem to employ an anæsthetic for criminal purposes.

We must adduce one instance of a proposal to stupify by drugs of this character. When Ningpo was in possession of the English, a bold effort was made for its recapture by surprise. A large number of "braves" were secretly housed in the city, and a few hours before the time appointed for rising, the mandarins sent for distribution among a portion of the concealed force, a quantity of stupifying drug in the form of pastiles. Arrangements were made for a simultaneous attack on the West and South gates by night, and, while some of those within the city were to set off noxious vapor in houses occupied by the English, others were to force open the gates. The plot failed through the dilatoriness of the fumigating squad. They arrived too late. The noise of the attack aroused the English, and its partial success enabling a large force to enter the city caused a dreadful carnage among the spirited assailants. Yet their confidence in the utility of fumigation was not impaired; for it was not long after that a barbarian soldier was captured by this means and beheaded. Many were the plans set afoot for the capture of the English chief *Pu-ting-ché*—for whose head ten thousand teals were offered. At the present juncture, our friends at the South, whose heads are of any particular value—we mean in the Chinese market—would do well to keep their eyes open.

It is said that not far from every poison its antidote may be found. These soporific pastiles come within that rule. The difficulty in poisoning cases is to know where to look for the desired neutralizer. That our toxicological notes may not be wholly devoid of practical information, we shall give some simple directions for the guidance of those whose premises are invaded

by fumigators. It is assumed that you are wide awake at the time, for, if you are caught napping, there is no remedy. In the first place then, take care that you do not bawl out. Shut your mouth. Hold your breath. Rush at the intruder—seize his tail in your left hand, and with the thumb and index finger of the right, lay hold of his nose, just above the alae, with a firm grip, and a bolus will plump out of each nostril, with which you are to plug your own nasal passage (do not be fastidious) and you may then commence breathing (your mouth still closed,) for these medicated pledgets possess the property of decomposing the somnolent gas. If successful in these manipulations, you will have the gratification of seeing your foe gasp and tumble over, *hors de combat*, into the pit he had prepared for you. Allusions are often made to a mysterious and extremely virulent poison taken by men of high rank when on the eve of execution: it is derived, according to vulgar belief, from a protuberance on the head of a species of stork. Whatever the agent may be, it is unquestionably one of great potency. An officer, who was eye-witness to the decapitation of the venerable and lamented General Yu Tsien, informs us that, when the victim of Manchu malignancy was led out to slaughter, something was placed on the tip of his tongue, which, without the infliction of pain, rendered him insensible in less than half an hour. Friendly mandarins then retained his moribund frame in an erect posture to receive the painless death-blow.

Nearly all the vegetable and mineral poisons known in the West are found in China, and have been employed for homicidal or suicidal purposes. Laurel water, hemlock, hyoscyamus, belladonna, stramonium, nux vomica, and a long list of other indigenous plants, known and unknown, are always at hand, though not often employed, owing to the facility of obtaining opium. Dogs are often poisoned by thieves by giving them rice in which nux vomica has been boiled. It is not an uncommon practice for countrymen to throw an infusion of croton tiglium into a pond, a mode of fishing made easy:—the morning following the operation every fish is found floating on the surface, dead. They are then taken to market, but, though somewhat insipid, are innoxious. Some species of fish found on the coast are intensely poisonous, as of course are several kinds of mushrooms, which,

with other edible poisons, are employed by those who aim at robbery or murder. For suicide, after opium, the most common agent is the sediment of brine—which is highly corrosive. Pure gold is not uncommonly used; it probably acts in the same manner. Quicksilver has also been used for the same purpose; we are uninformed respecting its action. Arsenic, although cheap and abundant, is not easily procured, vendors being held responsible for consequences, whether suicide or murder. The yellow, or sesqui-sulphuret (*orpiment*) abounds in Kunchâng in the S. W. of Kansuh. It is employed externally to venomous wounds; as a sternutatory to counteract miasmatic effluvia in summer, and internally, as a tonic in several diseases, and as a prophylactic; on the fifth day of each fifth month, persons of every age and condition drink spirituons liquor in which some powdered has been thrown, under the belief that it is preventive of epidemic diseases. The Chinese do not consider this mineral as related in any way to arsenic. By arsenic, they mean the red or protosulphuret (*realgar*). This mineral is found abundantly in Sinyang—Honan, arsenious acid (*white oxide*) is also met with, a collateral product, it is said, in some glass work, derived doubtless from an ore of cobalt. The sulphurets were known to the ancient alchemists of China, and were early employed in medicine; the utility of the last named in intermittent fever has not been long known, says the Pun Tsau—Materia Medica. Water, in which common green bean has been boiled and pounded, is given in cases of arsenic poisoning. It can be of use only as a demulcent. We are told that Mongolian hunters beyond the Wall eat it to enable them to endure cold, when patiently lying on the snow to entrap martens. In this part of China, arsenic is taken by divers, who, in cold weather, plunge into still water in pursuit of fish, which are then found hybernating among stones at the piers of bridges. We perceive with regret that the modern Chinese have added arsenic to their habitual stimulants. The red sulphuret in powder is mixed with tobacco, and their joint fumes are smoked in the ordinary manner. We have met with no habitual smokers of this compound of mineral and vegetable poisons; but persons who have made trial state that dizziness and sickness attend first attempts. After a few trials, arseniated tobacco may be taken without any

apparent inconvenience. From reports given of it we infer that its effects on the Chinese are analogous to what is observed among the arsenic-eating peasants of Austria. The use of arsenical vapor by inhalation merits the attention of physicians as a remedial agent.

At Peking, where arseniated tobacco is most in use, it costs no more than the unmixed article; it may be known by the red color imparted to the vegetable by the powdered proto-sulphuret. Its introduction is attributed to Cantonese from Chauchau. If this be correct, it is probable that these Southerners, unable at the North to procure the masticatory to which they are addicted, sought to appease a craving for the pungent but harmless lime and betel-nut, by substituting the deleterious mineral gas. Many of the miserable victims of opium, to whom that narcotic is a necessity and not a pleasure, have eagerly employed the new stimulant to prop and exhilarate their exhausted bodies, and, perhaps, have thereby meliorated and prolonged their existence. We would fain hope that the use of arsenical stimulants will not become general; yet that pernicious custom is extending, and we know our race too well not to entertain fears on the subject. It is even stated that, for a time at least, the reigning Emperor in his boyhood preferred tobacco thus mineralized. Arsenical ores are used in the arts. In domestic economy, the red sulphuret is employed for making away with rats and husbands.

There is no evidence that poisoning as an art has been practised in China, and we search her annals in vain for a case parallel to that of Hong-Kong. Novelists sometimes describe the poisoning of armies or large numbers of people—the account of the aboriginal chief Manghwoh, who poisoned the springs of which the Chinese army drank, will recur to the reader of the historical romance—the Three States. It may be that instances of this kind are founded on fact: but the obvious futility of any attempt to poison fatally on a large scale is a guarantee that it will be seldom resorted to in warfare. Could such appliances be made subservient to the destruction of masses of men, they would certainly be put in requisition, as total annihilation of antagonists is always the aim of Chinese heroes—"no quarter" is their war-cry and "peculiar institution."—*London Pharm. Journ. October* 1, 1858, *from Edinburgh Medical Journal.*

Ningpo, March 2d, 1857. D. J. M.

ON THE BEHAVIOR OF VARIOUS SUBSTANCES TOWARDS PURE FUSED CHLORATE OF POTASH.

By Professor Böttger.

Pure fused chlorate of potash is an excellent reagent for manganese, being especially fitted for the detection of manganese in organic bodies. The presence of the smallest, scarcely ponderable trace of manganese may be instantly recognized, even when a small fragment (the size of a pea) of an organic body, which is to be tested for manganese, is thrown upon the surface of a small quantity of fluid chlorate of potash in a test-glass, by the fact that after the combustion of the body, the perfectly cold saline mass has a more or less rose-red or peach-blossom color in consequence of the formation of hypermanganate of potash. To make sure that the chlorate of potash employed as a reagent is perfectly free from manganese (the ordinary commercial salt almost always containing that metal,) a small quantity (1 drm.) of it is fused in a test-glass, and a few particles of pure carbon (prepared from perfectly colorless sugar-candy) are thrown into it. If the salt remain perfectly colorless on cooling, it is adapted for the purpose here referred to; but should it appear of a slight rose color, it contains traces of manganese, and must be rejected.

When pure chlorate of potash is heated by an ordinary spirit-lamp in a rather wide test-tube until it becomes perfectly fluid and begins to evolve oxygen gas, and small quantities of the following substances are thrown into it, the following results are obtained:—

Beech- and boxwood charcoal, and small fragments of cork charcoal, burn away with an intense light, jumping up and down, and leave a saline mass of a reddish color; whilst some kinds of pine and fir-woods, treated in the same way, leave the saline mass completely colorless when cold.

Some specimens of graphite, treated as above, were found to contain manganese.

Bitartrate of potash and tartaric acid burn with a violet light; the samples tested proved to be free from manganese.

Oxalic acid, as was to be expected, did not ignite.

Peroxide of iron is not converted into ferrate of potash; it remains perfectly unaltered, and only causes a violent evolution of oxygen gas; protoxide of iron ignites and burns to peroxide.

Fragments of the size of a pea of ordinary roll-sulphur, burn with an extremely intense white light to form sulphate of potash; peroxide of phosphorus in the same way forms phosphate of potash.

Phosphorus must only be employed in small fragments of the size of a pin's head, in a perfectly dry state, and always with care; the combustion takes place with evolution of an extremely intense white light.

Pulverulent antimony burns with scattering sparks.

Iron-filings burn away with a fine light when the chlorate of potash has been so far heated that the evolution of oxygen gas begins to be violent; glowing globules of sesquioxide of iron are formed, and usually pierce through the bottom of the test-tube, for which reason great caution is to be recommended.

Metallic arsenic burns, diffusing an intense white light, and forming arseniate of potash.

Powder of bismuth does not ignite, but is gradually converted into oxide of bismuth.

White sugar-candy burns with an extremely beautiful violet light, which finally becomes white.

Lead-filings have no action; carbonate of lead becomes converted into peroxide of lead.

Platinum-black and fine spongy platinum burn with a very slight scattering of sparks.

Fragments of tin-foil are burnt with difficulty, and with a scarcely perceptible scattering of sparks, and only when the evolution of oxygen begins to grow violent; it forms peroxide. Tin-dust behaves in the same way, as does silver-dust (true silver-bronze.)

Very fine copper-dust (true copper-bronze) burns briskly to form oxide; this is also the case with false gold-bronze (an alloy of copper and zinc.)

Paris blue burns with a strong, beautiful violet light, leaving peroxide of iron.

Crystallized gallic acid detonates violently, with a strong evolution of light; hence great caution is necessary.

Indigo burns with an extremely intense white light.

Some samples of commercial iodine left a slightly reddish saline mass; they consequently contained manganese.

Black sulphuret of antimony in powder burns quietly with a yellowish white light.

Dry extract of logwood burns with a very intense light, as does also gamboge, with evolution of a black smoke.

Caoutchouc burns with an exceedingly intense light, as soon as the evolution of oxygen begins to be tolerably strong; great heat is evolved, so that the bottom of the test-tube is not unfrequently melted.

Tea-leaves impart to the mass a tolerably strong red color, they therefore contain manganese.—*London Chem. Gaz., Oct.* 15, 1857, *from Buchner's Neues Repert.*

NEW PROCESS FOR PREPARING ANTIMONIATE OF POTASSA.

This process consists in decomposing golden sulphuret of antimony with pure potassa ley. The sulphuret is boiled with the ley, which gives rise, on one hand, to sulpho-antimoniate of potassa; and on the other, to the antimoniate. The two salts remain in solution, owing to the excess of ley employed. It is boiled with recently precipitated hydrate of copper, which changes its oxygen for the sulphur of the sulphuret of antimony, and gives rise, on the one hand, to sulphuret of copper, and, on the other, to antimonic acid, and, consequently, to antimoniate of potassa. The operation is terminated when a small test of the liquor is no longer precipitated black by acetate of lead. On the contrary, the precipitate which is formed, should be of a beautiful white.

The filtered solution then contains nothing but antimoniate of potassa; the antimonic acid is precisely in the modification which M. Fremy has mentioned, as proper for precipitating the salts of soda.

In using this reagent, care must be taken to operate only on alkaline, or at any rate neutral liquors. With acid liquors, a precipitate is indeed produced, but this precipitate is *antimonic acid.*

The author asserts, that by attending to the above recommendations, even very small quantities of soda may be precipitated; but it is indispensable that the liquid to be examined contain no metallic salts, the other oxides, with the exception of potassa and ammonia, being precipitable by antimoniate of potassa.—*London Chemist, November*, 1857, *from Neuer Lahrbuch für Pharmacie.*

ON THE MAPLE SUGAR OF THE UNITED STATES.

By M. J. B. Arcquin.

The sugar maple, Acer saccharinum, is very common in the Western and Northern States; these trees often cover entirely a very extensive surface of land; but they are most commonly dispersed in forests amongst other trees; and, in this case, we may expect to find from 25 to 30 per acre of forest. This tree grows especially in rich soils, in which it attains the height of the green oak, or of strong apple trees. The trunk is sometimes from two to three feet in diameter. In the spring, the maple is covered with flowers, before the appearance of the leaves. It is supposed to arrive at its complete development at the age of 20 to 25 years.

The sap of the maple is procured by perforating the trunk to the depth of one or two inches. A tube is then adjusted to the hole, in an inclined position; but so as not to penetrate to the bottom of the hole; under this is placed a vessel to receive the liquid as it flows. It is the custom, first, to perforate the tree on the side facing the south; when the sap begins to flow less abundantly, another issue is then opened on the northern side. The most favorable season is the commencement of spring, in February, March, and April; the sap flows for five or six weeks. The more sap is obtained as the days are warmer, and the nights cooler. The quantity collected in 24 hours, varies from one quart to five gallons. The temperature of the air exerts the greatest influence on the evacuation of the sap; for example, it totally ceases during a frosty night, after a very warm day.

These trees do not appear to suffer from many repeated perforations; a tree is mentioned which continued to flourish after having

given sugar for 42 consecutive years; they do not generally last so long. In certain cases, which must, however, be regarded as exceptional, as much as 104 litres of sap were obtained in 24 hours, from which were extracted 2 kil. 220 gms. (nearly 5 lbs.) of crystallized sugar; but a maple of ordinary dimensions yields in a favorable season 113 litres, producing 2 kil. 500 grs. (about 5½ lbs.). This quantity is regarded as the annual yield of a tree.

It may, consequently, be generally supposed, that the sap contains 2·50 of its weight of drained sugar. It has been ascertained, that, by cultivation, the Acer saccharinum becomes more productive. Thus the forest maples, which have been isolated by felling the surrounding trees which sheltered them from the light of the sun, or trees transplanted into orchards, have yielded a more abundant and richer sap, containing as much as 3 per cent. of sugar.

The extraction of the sugar from the sap of the maple, presents nothing remarkable; the method followed is analogous to that adopted for the treatment of cane juice. It is necessary to boil it as quickly as possible, because it alters and ferments very rapidly, to such an extent that, in some parts of the United States they make with it an alcoholic liquor, analogous to that given by cane juice which has undergone fermentation (*flangourin*, the *chicha* of South America). In the preparation of maple sugar, a considerable quantity of molasses is obtained, owing to the abundance of soluble salts which exist in the sap. It is known, moreover, that by combustion, the maple leaves ashes very rich in potassa. The sap of the maple contains acetate, hydrochlorate and sulphate of potassa, acid phosphate of lime and of magnesia.

The formation of sugar in the maples does not take place in the roots, but in the ligneous body. The proportion of sugar of the sap increases, until the latter reaches a certain height in the tree; beyond that point, it undergoes no change.

Maple sugar in the crude state, has a brown color; it contains a little mannite; this mannite is found especially in the molasses of this sugar with the saline matters. This sugar, which is consumed chiefly where it is produced, is not refined; it would lose considerably in the process of refining. It is one of the rudest

manufactures; it is carried on in the forests themselves, in the open air, in iron boilers containing a hundred litres.

The manufacture of this kind of sugar is a great resource for the new establishments in the countries where the sugar maple grows abundantly in the forests; but it is evident that this mode of procuring sugar can be adapted only for certain localities at great distances from the centres of population, where this matter may supply the place of cane sugar to the country people.

In his *History of Virginia*, Beverley says, that the Indians made maple sugar before this country was occupied by the Europeans; others, on the contrary, affirm that it was entirely unknown to them, or at least that certain tribes had no knowledge of it.

Maple sugar has been made for many years in the United States.

The State of Ohio produced	3,033,806 lbs.	of this sugar
The State of Kentucky	2,471,647	"
In 1840, the whole of the maple sugar produced in the United States amounted to	35,105,705	"

In 1844, four States of the American Union, Indiana, Ohio, Vermont and New York, yielded more than 25,000,000 lbs. of maple sugar. This crop is not the same every year; it varies according as the seasons are more or less favorable. In the Northern and Western States, united, the annual crop may amount to from 35 to 40 millions of pounds, and the molasses to 600,000 or 700,000 gallons; but this estimate is not accurate; we cannot place reliance in *official reports;* we will give a proof of this in the course of this article.

In 1850, the United States produced only 34,253,436 lbs. of maple sugar.

The molasses furnished by this same sugar amounted to 626,000 gallons. The official returns give nothing accurate on this subject.

This year, 1857, cane sugar and molasses being exceedingly high in price, it may be supposed that an abundant crop of maple sugar will be collected, if the season is favorable. It is towards the end of February, and in March and April that the crop is collected, at the rise of the sap.

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In the following table, we give the quantities of maple sugar made in each State in 1850, giving the official reports for each State; results obtained in the great census, published in 1850:—

MAPLE SUGAR MADE IN THE U. STATES OF AMERICA IN 1850.

Names of the States.	Maple Sugar; Number of Pounds.	Molasses; Number of Gallons	Observations.
Maine	93,542	3,167	There is here a considerable difference in the yield of molasses. To what is it to be attributed? In New Hampshire, 1,298,863 pounds of sugar, gave 9,811 gallons of molasses; in Vermont, 6,349,357 pounds of sugar, furnished only 5,997 gallons. There must certainly be errors in the official reports.
New Hampshire	1,298,863	9,811	
Vermont	6,349,357	5,997	
Massachusetts	695,525	4,693	
Rhode Island	28	4	
Connecticut	50,796	665	
New York	10,357,484	56,539	
New Jersey	2,197	954	
Pennsylvania	2,326,525	50,652	
Delaware	"	50	
Maryland	47,740	1,430	
Virginia	1,227,665	40,322	
North Carolina	27,932	704	
South Carolina	200	"	States in which the sugar cane is cultivated, particularly in Louisiana. There only an insignificant quantity of maple sugar is made.
Georgia	50	"	
Florida	"	"	
Alabama	643	"	
Mississippi	"	"	
Louisiana	255	"	
Texas	"	"	
Arkansas	9,330	18	There are evidently errors here, the molasses not having been reckoned.
Tennessee	158,557	"	
Kentucky	437,405	"	
Missouri	178,910	5,636	
Illinois	248,904	8,354	
Indiana	2,921,192	180,325	Maple sugar is made in all the counties of the State of Ohio, and throughout almost the entire extent of Indiana and Michigan.
Ohio	4,588,209	197,308	
Michigan	2,439,794	19,823	
Wisconsin	610,976	9,874	
Iowa	78,407	3.182	
Minnesota Territory	2,950	"	
	34,253,436	599,488	The production of molasses is certainly much greater.

SIMPLE PROCESS FOR RENDERING STUFFS WATER-PROOF.

M. Thieux, of Marseilles, proposes the following simple process for rendering stuffs water-proof.

In two vessels, each of a content of 12 gallons of river water are dissolved, in the one 3½ lbs. of alum, in the other the same weight of sugar of lead. When the solutions are complete, pour the liquids together, by which will be formed an insoluble sulphate of lead, and soluble acetates of alumina and potassa, mixed with a slight excess of alum. As soon as the liquid has become clear, it is drawn off and the stuffs plunged into it; they must be strongly compressed while under the liquid to expel the air from their pores, and then suffered to soak for at least four hours, so as to insure the perfect penetration of the liquid everywhere. When withdrawn, they are lightly shaken, then dried, brushed, and pressed with a hot iron. It appears that various specimens of cloth experimented on by the Committee, absorbed from 11 to 17 per cent. of their weight of saline matters, and retained their original appearance, and their pliability at all temperatures. But after immersion in fresh water for 24 hours, they lost all their additional weight. As to the efficacy in this process, there appears to be a very serious difference of opinion; the conclusions of the Committee appointed to examine it, as reported by M. Jacquelain, are that it is not new, nor as good as was announced; but it had been tried and approved for five years by the Lyons and Mediterranean Railroad Company; that the Committee could not tell whether it was durable or not: its cost was about 20 cents for water-proofing a coat or pair of pantaloons. On the other hand, M. Balard, known to all as one of the most distinguished and careful chemists of France, reports that the thinnest woollen cloths impregnated with it, are totally impermeable to water after weeks of contact with it; that the water evaporates from them and does not pass through; that cloths which had been soaked for 48 hours in fresh water, were as impermeable afterwards as before; that cloths rendered water-proof in this way, and exposed on wicker-frames to the rains of October, never allowed a drop of water to pass; that a cloak of cloth thus prepared, stretched over a willow frame, and exposed

to the stream from a fire-engine worked by six strong men, from a distance of 15 yards, allowed no water to pass, except where the stuff was in contact with the frame and was compressed upon it by the violence of the jet, but the transpiration from the skin appears to destroy the impermeability, so that it is probably applicable only to exterior clothing; finally, that there is every probability that it is lasting, as appears from the certificates. M. Balard himself testifies that an overcoat worn by him for five months, which had been beaten and rubbed and subjected to all the ordinary usage of overcoats, remained perfectly impermeable. Cloths prepared in this way are said to be softer to the touch, warmer, absorbing less moisture, drying more quickly, and therefore more durable.

It would appear, therefore, that this process, which is cheap and easily applicable, even after articles are made up, is well worth experimenting upon.—*London Chem. Gaz., Nov.* 2, 1857, *from Journ. of the Franklin Inst. for April*, 1857.

ON THE IMPURITY OF BROMIDE OF POTASSIUM.

By A. B. Garrod, M. D.,

Professor of Materia Medica and Therapeutics at University College, London.

Bromide of potassium, on account of the encomiums passed upon it by the late Dr. T. Williams, was introduced into the London Pharmacopœia of 1836; it had been found useful by the above-mentioned physician, more especially in diseases of the spleen, in cases where this organ had become hypertrophied or enlarged. However, during the interval which elapsed between the publication of the Pharmacopœias of 1836 and 1851, its advocate passed from among us, the drug was not very extensively employed, and it was omitted from the College list of the Materia Medica. This, I think, is to be deplored, for either it had not adequate claims to be admitted in 1836, or sufficient time was not allowed for its remedial powers to be fully and properly investigated. Within the last few years it has been much more extensively employed, both in this country and in France, and for some lengthened period—certainly since 1851—I have given it rather largely, both in private and hospital practice. Bromide of potassium produces many peculiar physiological effects, and

possesses therapeutic powers differing from those of iodide of potassium; at the same time it does not cause certain very unpleasant symptoms which so commonly occur during the administration of the iodide, and which not unfrequently prohibits its exhibition. I refer more especially to the affection of the mucous membranes of the nose, throat, &c. Bromide of potassium is usually given in much larger doses than the corresponding iodide, and it is therefore of considerable importance that it should be dispensed in a pure state, and especially that it should be free from admixture with other salts liable to produce powerful effects upon the animal economy.

Is it usually found in a pure state?

From my own experience, I fear not. During the present summer, when about to lecture on the bromide to the class at University College, I procured some of the urine from one of my patients in the hospital, who at that time was taking the drug in rather large doses, and proceeded to examine the fluid by means of starch and chlorine water: to my surprise, however, a very copious precipitate of the dark blue iodide of amidin took place, and no evidence of the presence of bromine was afforded. I was forced, therefore, to conclude either that iodide of potassium had been dispensed in lieu of the bromide, or that the bromine had been converted into iodine in its passage through the animal economy, a not very probable occurrence, or lastly that the bromide of potassium made use of contained a considerable amount of iodide. The last supposition was found to be the true one, for, on making an examination of the salt with the starch test, such was the intensity of the blue produced by the contained iodine that none of the orange-colored bromide of amidin could be seen.

Since the time I first found iodine in bromide of potassium, I have made several qualitative examinations of different specimens of the salt procured from different sources. One sample in my possession since 1845 was found quite free from iodine. Another, obtained in 1850 from one of the largest drug establishments in town, was rich in that element; and I have specimens, probably recently prepared, some strongly contaminated, others without a trace of iodine. I believe, however, from what I have observed, that the presence of iodine in the bromide of potassium of com-

merce is by no means an unfrequent occurrence; and I think that many of my hearers, if they examined the specimens in their possession, would find my statement correct. Whether the contamination is intentional or not on the part of the manufacturers I have no means of ascertaining. At present, I believe, there is no object in making such addition as far as price is concerned, but I am informed that the bromide containing iodine crystallizes in much larger crystals, and forms a better-looking article than when free from such admixture. My own examination of different specimens would lead me to think that such is the case.

As I consider the subject of the purity of bromide of potassium one of great importance, seeing that the drug will probably be extensively employed in medicine, I have been induced to bring it under the notice of the Pharmaceutical Society, knowing how much the Society has already done towards improving the state of Pharmacy in this country, and how anxious the members are to ensure the dispensing of pure drugs—a desideratum alike important to the Physician and Pharmacopolist.—*London Pharm. Jour., Nov.* 2, 1857.

IODIDE OF CADMIUM.

By A. B. Garrod, M. D.

Within the last three years I have made a somewhat extensive trial of iodide of cadmium as an external remedial agent, and, as far as my experience goes, have reason to be fully satisfied with the results. I think also that it may prove an addition of some value to the list of our Materia Medica. I had previously felt the want of an agent containing iodine, and fitted for external application, those usually employed having many objections. The *free iodine,* or iodine combined with iodide of potassium, as occurs in unguentum iodinii compositum, Ph. L., is frequently too irritant in its nature, besides which, its disagreeable odor, and the staining of the cuticle which it produces, is often very objectionable.

The simple *iodide of potassium* ointment as ordinarily dispensed, is gritty in character, often to such an extent as to render its application to delicate skins impracticable, and it not

unfrequently becomes brown from liberation of free iodine; now although these inconveniences may be removed by proper management and care as to the purity of the drug, nevertheless I am disposed to look upon the salt when mixed with fatty substances as not very readily absorbed by the skin, and consequently not well adapted to produce the peculiar local effects of iodine, which it is often so advantageous to obtain; for it must be remembered that iodine is not always used simply for its rubefacient or counter-irritant action.

The ointment of *iodide of lead* likewise possesses certain objectionable qualities. Although not irritant to the skin, still it stains the cuticle yellow. And again, I consider the long-continued use of lead is undesirable; for we know that it is apt to induce many injurious effects when absorbed into the system, lead cachexia, colic, and different forms of paralysis, as wrist drop, &c.; these may occur even when very minute quantities are introduced, and such absorption might readily take place when the preparations are employed for any lengthened period around diseased joints, or over enlarged glands.

I believe, however, that *iodide of cadmium* possesses all the valuable qualities of iodine, iodide of potassium, or iodide of lead, when applied externally, and at the same time it is free from the various noxious properties of these preparations. The salt occurs in the form of mother-of-pearl-looking plates or six-sided tables, quite white and transparent, unaltered in the air, very readily soluble both in water and alcohol, consisting of equal equivalents of iodine and cadmium, or 69.46 per cent. of iodine and 30.54 per cent. of cadmium. It is readily distinguished by giving the blue color with starch and chlorine, and the characteristic yellow precipitate with sulphuretted hydrogen. It forms a perfectly white and soft ointment, producing but little local action upon the skin, and appearing to be readily absorbed when properly applied with friction.

Under the use of an ointment of this salt, consisting of one part of the iodide to eight parts of lard, I have witnessed in many cases enlarged scrofulous glands, rapidly reduced to their normal dimensions, great relief likewise given in various forms of nodes, and have also, in several instances, seen much advantage from its application to joints affected with chronic forms of inflamma-

tory disease. It is extremely applicable in some forms of cutaneous disease, chilblains, &c. There is besides every reason to suppose that the absorption of cadmium into the system would not be attended with any injurious consequences, as it appears to be closely allied to zinc in its action upon the animal economy.

I believe that since I first made use of the iodide of cadmium as an external remedy, several physicians and surgeons have employed it, and I am inclined to introduce it with some confidence to the notice of the profession.—*London Pharm. Jour., Nov.* 2, 1857.

Varieties.

Basford's Compound Percolator.—J. K. Basford, druggist, in this city, claims to have invented an entirely new and valuable Percolator for the purpose of making solutions, decoctions and fluid extracts, such as are used by the medical profession. The apparatus may be appropriately called "Basford's Compound Percolator." This Percolator consists of a double tin cylinder, or a cylinder within a cylinder, so soldered together that there is a space of about a quarter of an inch between them, in which it is intended to keep water and generate steam for heating purposes. The lower end of the cylinders narrow down into a funnel shape, so as to go into the neck of a bottle or receiver. On the upper end of the double cylinder, there fits tight a tin can or reservoir designed to hold and heat the alcohol or water, or other liquid with which the extract is to be made. This can has a bottom above the point at which it fits to the cylinder part of the apparatus. In this bottom there is a valve, opened and shut by a screw on the outside, and also a tube fixed in the bottom, and reaching up nearly to the top of the can, intended to let off whatever steam may arise in this reservoir during the heating of the liquid in it, and allow it to pass below into the cylinder part of the apparatus. On the outside of the lower part of this can there is a rim of tin, so constructed that between the rim and the side of the can there is a space which will hold burning alcohol and allow the flames to play around and heat the sides of the can. There is also a rim of the same kind and for the same purpose at the funnel-shaped part of the cylinder portion of the Percolator.

The apparatus may now be supposed to be placed in position and ready for use. The cylinder is placed with the funnel part downwards, and fixed in a bottle to receive the extract. The end of the funnel is closed with a

stop-cock. A small lot of cotton is placed in the lower part of the funnel, and upon this is thrown the ipecac, cubebs, sarsaparilla, or other substance of which a fluid extract is desired. The can or reservoir is filled with diluted alcohol or other liquid, and fitted to its place above the cylinder containing the drug. The space between the cylinders is partly filled with water by a small tube, and alcohol for burning and heat-making is poured into the spaces made by the rims, referred to above. Fire is then applied to the alcohol in the rim above, and the liquid in the can is heated hot. As it becomes heated, the steam arising passes down through the tube on to the drug. At the same time the alcohol in the lower rim is fired, and it heats the water between the cylinders and makes steam of it.

The drug in the inside of the apparatus is soon moistened and heated by the steam coming down from the can above, and is also surrounded by a hot steam bath. This heat tends to separate the volatile oil and all the essential constituents from the drug, without burning them, and then the valve in the bottom of the can above is opened, and the finished extract trickles down through the cotton into the bottle or receiver. The volatile oils, not being able to escape during the heating process, and not being injured by the tempered steam heat, are condensed and pass down with and in the extract.

An opportunity was afforded us a few days ago of witnessing the working of this admirable apparatus, and we saw an extract made in a quarter of an hour, which, according to the method in the Dispensatory, requires a long period of soaking. We examined a number of extracts made in almost incredibly short spaces of time with it, and they all appeared to be excellent. Other persons, who should be good judges of such things, pronounce them excellent. The invention is, of course, valuable chiefly to druggists and physicians; but, if valuable to them, it is or should be interesting to the whole community.—*San Francisco Bulletin.*

An Apparatus for Corking Bottles has been devised. This instrument which compresses the cork and shoots it into the neck of the bottle, is a piece of hard wood about six inches long, divided in the centre by a hinge. At the centre the circumference is about three inches, tapering down to about an inch. The lower part is hollow, into the upper portion of which, above the hinge, a piston is fitted; and into the lower cavity a cork is put, the hinge is then closed. The lower portion, which is scooped out so as to fit the top of a bottle is laid on a bottle, the piston is then smartly tapped on the head, and it shoots the cork, with unerring certainty, into the neck of the bottle, and level with the top, and with more firmness than any known operation at present in use. The whole operation of corking a bottle of any size with any sized cork, does not occupy a second of time and no matter how large the cork, it is compressed to fit the bottle in its operation downwards, and it is utterly impossible for the bottle to be

broken, as all the pressure comes on the machine itself. It can be carried in the pocket, and is most decidedly an astonishing apparatus.—*Druggists' Circular.*

Green Varnish.—For the production of this varnish, a resinous soap must first be prepared, which is easily done by the following recipe:—15 parts by weight of powdered colophony are stirred up with 18 parts by weight of water in an iron pot, and heated to boiling; a solution of 2 parts of crystallized carbonate of soda in 5 parts of water is then slowly added, by stirring, to the mixture, which is again brought to boil. After the addition of a similar quantity of carbonate of soda, the whole is boiled until all the resin has disappeared; it is then allowed to cool, and to become clear by standing. The clear solution is mixed with an aqueous solution of sulphate of copper, as long as a precipitate is produced; this is then allowed to settle, or filtered through linen. After drying, it forms a pale green, pulverulent mass, which dissolves readily in turpentine, and then forms a beautiful green varnish.—*Chem. Gaz. from Polyt. Centralbl.* 1857, p. 544.

Artesian Wells in the Desert.—The *Moniteur Algérien* brings an interesting report on the newly bored artesian wells in the Sahara Desert, in the province of Constantine. The first well was bored in the Oasis of Oued Rir, near Tamerna, by a detachment of the Foreign Legion, conducted by the engineer, M. Jus. The works were begun in May, 1856, and on the 19th of June a quantity of water of 4010 litres per minute, and of a temperature of 21° Reaumur, rushed forth from the bowels of the earth. The joy of the natives was unbounded; the news of the event spread towards the south with unaxampled rapidity. People came from long distances in order to see the miracle. The Marabouts, with great solemnity, consecrated the newly-created well, and gave it the name of "the well of peace." The second well, in Temakin, yielded 35 litres, of 21° temperature, per minute, and from a depth of 85 metres: this well was called "the well of bliss;" a third experiment, not far from the scene of the second, in the Oasis of Tamelbat, was crowned with the result of 130 litres of water per minute. The Marabouts, after having thanked the soldiers in the presence of the population, gave them a banquet, and escorted them in solemn procession to the frontier of the oasis. In another oasis, that of Sidi-Nached, which had been completely ruined by the drought, the digging of "the well of gratitude" was accompanied by touching scenes. As soon as the rejoicing outcries of the soldiers had announced the rushing forth of the water, the natives drew near in crowds, plunged themselves into the blessed waves, and the mothers bathed their children therein. The old Emir could not master his feelings; with tear in his eyes, he fell down upon his knees, and lifted his trembling hands

in order to thank God and the French. This well yields not less than 4300 litres per minute, from a depth of 54 metres. A fifth well has been dug at Oum Thiour, yielding 108 litres per minute. Here a part of the tribes of the neighborhood commenced at once the establishment of a village, planting at the same time hundreds of date palms, and thus giving up their former nomadic life. The last well is that of Shegga, where soon an important agricultural centre will spring up. There is no doubt but that these wells will work in these parts a great social revolution. The tribes which, after the primeval custom of their ancestors, kept wandering from one place to another, will gather round these fertilising springs, will exchange the herdsman's staff for the plough of the farmer, and thus take the first steps towards a civilization which, no doubt, will make rapid progress in Northern Africa.—*London Pharm. Jour. from Journal of the Society of Arts.*

Induration of Plaster of Paris Casts.—A Neapolitan builder, Signor Abate, has submitted to the Académie des Sciences numerous specimens of plaster casts as hard as marble, and as susceptible of receiving a fine polish. Instead of saturating the plaster, as is ordinarily the mode of proceeding, with eight times its volume of water, Signor Abate combines it with the minimum quantity of water, whereby porosity is avoided, and the consequent liability to disintegration of the mass after exposure for a certain time to the atmosphere. For this purpose the plaster is reduced to a state of powder in a horizontal cylinder, to which rotary motion is communicated, and steam is admitted into the interior. By this means the quantity of water absorbed by the plaster may be regulated as desired. The plaster thus prepared still remains in a powder, and in that state is filled into moulds and submitted to hydraulic pressure for a short time. The moulded articles are removed from the moulds and found to possess great compactness, and take a fine polish.—*London Pharm. Jour. from Journal of the Society of Arts.*

Factitious Ivory for Photography. By J. E. Mayall.—This invention, by the well known photographer of Regent Street, relates to the use of artificial ivory for receiving photographic pictures instead of glass or paper. This artificial material, which possesses all the properties and beautiful finish of ivory, and allows of any subsequent tinting of the image, and the obtainment of superior softness in the semi-tints, is what is known in France as Pinson's artificial ivory, consisting of a compound of gelatine and alumina. This material is prepared in the form of slabs, for the photographer's, use in this way:—The tablets or slabs are composed of gelatine or glue in its natural state, and are immersed in a bath of alumina, which is held in solution by sulphuric or acetic acid; by this means a complete combination takes place between the alumina and the gelatine or

glue. The tablets or slabs should remain in the bath a sufficient time to become thick enough for the purpose for which they are required, and to allow the alumina to entirely penetrate them and evaporate itself therewith; they are then removed and allowed to dry or harden, when they may be dressed and polished by any of the ordinary and well-known processes for polishing ivory.

Artificial ivory tablets, capable of bearing a fine polish, may also be made by mixing alumina directly with gelatine or glue; but this process is not so satisfactory as the process hereinbefore described, since the thickening produced by the admixture of alumina with the gelatine renders the manufacture of the sheets both difficult and expensive.

Another composition of artificial ivory which is employed consists of equal portions of bone or ivory dust, used either separately or combined, and albumen or gelatine, the whole being worked into paste, and afterwards rolled out into sheets by suitable rolling or flattening mechanism. The sheets are then allowed to harden by exposure to the atmosphere, and are cut into slabs or tablets of the required size. But it is preferred to use two parts of fine powdered baryta, and one part of albumen, well worked together, and rolled out into slabs. The best plan hitherto discovered for working the materials together, is that commonly used in the manufacture of Parian marble; this composition may also be spread upon paper, if desired. These slabs or tablets are then carefully scraped to give them a perfectly even surface. They are then washed with alcohol, to remove any impurity therefrom, and are prepared in the ordinary manner to receive positive pictures. The pictures having been printed, the entire slab or tablet may be immersed for a few minutes in a weak solution of nitro-sulphuric acid or nitro-hydrochloric acid, for the purpose of rendering the picture more clear and brilliant. It is then fixed in the usual manner with hypo-sulphite of soda, and is washed, and then dried on a marble or other slab, or under pressure, to prevent it from warping.—*London Pharm. Journ.*, Oct. 1, 1857, from *Lon. Prac. Mech. Jour.*

Preservation of Wood, &c. by means of Coal Tar Oil.—Creosote.—Dr. Vohl recommends mixing the creosote with caustic soda until it becomes miscible with water in any proportion, and applying this liquid to the wood. It is very rapidly absorbed, and when the wood is saturated the creosote is fixed by immersing the wood in a dilute solution of sulphate of iron. The sulphuric acid combines with the soda, the creosote with the woody fibre, and the protoxide of iron that is precipitated is subsequently converted into peroxide by the atmospheric oxygen absorbed by the wood, while the sulphate of soda washes out when the wood is buried in the ground. Wood prepared in this way has stood for eight years, exposed to varying influences of climate, without showing any indications of decay. Dr. Vohl states that the coal tar oil, commonly called creosote, consists for

the most part of ethereal oils, and contains only a small per-centage of creosote or of carbonic acid. He recommends, for the examination of this oil, mixing a known volume with 10 per cent. of strong caustic alkaline solution in a graduated tube, and shaking the mixture well. After a time it separates into three layers, the lower one being pure caustic alkali, the middle one contains the creosote and carbolic acid, and the upper layer consists of the ethereal oils. As the real value of the oil used for impregnating wood depends upon the amount of creosote and carbolic acid it contains, this method may serve for its valuation. In this way Dr. Vohl has found that coal tar oil obtained from England, France and Belgium, does not contain at the most more than 8 or 10 per cent. of creosote and carbolic acid, while the oil obtained in the production of photogen contains at least 70 per cent. of these subtances.

The impregnation of ships' cordage and sail-cloth with creosote is effected by means of the combination of creosote with gelatinous substances, such as skin, leather, &c. For this purpose the cloth or rope is immersed in a dilute solution of gelatine, and then passed through a bath of oak-bark decoction, after which it is impregnated with creosote. Sail-cloth treated in this way has been in ordinary use for six years without showing signs of decay.--*Lond. Pharm. Jour., Oct.* 1857.

Method of Cleaning Soiled Silver Vessels, &c.—Prof. Böttger states that silver utensils, which are stained by sulphuretted hydrogen, &c., may be easily cleaned, by immersing them in a boiling saturated solution of borax, or a moderately concentrated solution of caustic potash in contact with metallic zinc. A zinc sieve may be used.—*Ibid.*

Theory of Substitution.—The theory of substitutions has been attributed by some to Dumas, and by others to Laurent, and others still to Gay Lussac. The question of priority, discussed by Laurent in his *Méthode de Chimie*, p. 241, has been recently taken up by Dumas, who has established the precise facts upon exact documentary evidence. It appears that the first idea of substitution is due to Dumas, who, on the 13th of January, 1834, made the formal statement that, "*when a hydrogenated substance is subjected to the action of any dehydrogenating substance, it takes up a portion of the latter, equivalent to that of the hydrogen lost.*" Dumas at this same time designated this class of phenomena by the word *metalepsy*, an expression which has been attributed to Berzelius.

But the theory of substitutions required for its completion a correct knowledge of the part in the changes played by chlorine. It will be remembered that the idea of Laurent that "in the bodies obtained by substitution, chlorine not only takes the place of hydrogen, but acts the same part with it," met with general denunciation. It was followed by the bitter criticisms of Berzelius, Liebig, and Wöhler, and a declaration by Dumas disclaiming

all participation in the view, which he called an "exagération outrée de sa théorie."

For some time Laurent was alone; but after a while his time of triumph came. The theory was then attributed wholly to him. But the note published by Dumas in the Annales de Chimie et de Physique, dispels all doubts, and leads to justice being rendered to each of the two chemists,—to Dumas who opened the way, and to Laurent who established the theory and rendered it of practicable value.—*Am. Journ. of Science and Arts.*

Electric Illumination.—We have spoken of the experiments in electric illumination made at Lyons by Lacassaigne and Thiers. They have continued their trials with great success, and through the month of March lighted one of the principal streets of Lyons, between the hours of seven to eleven. Two pieces of apparatus set up at the extremities of the street upon a frame crossing between the roofs of the opposite houses, sent their beams down the middle of the street. The gas was not lit; all the illumination was obtained from the battery. The Rue Imperial is about 550 yards long, and is lighted with more than forty jets of gas; and yet, the gas light was fully replaced by the electric light. Something still remains to be done. It is important that the light should come from a much greater height, that it may be more diffused, and less blinding and fatiguing to the sight.—*Ibid.*

Atmospheric Electricity. Theory of thunder.—Among the theories of thunder, the recent one of M. Jobard, Director of the Museum of Industry of Brussels, should be counted; it may be called the chemical theory. According to it, thunder is nothing but the detonation of a detonating mixture of hydrogen gas, more or less carburetted, along with atmospheric air. The gas comes from decomposing organic matters and goes up in "pluies ascendants." Moreover, he assumes that the same gas sustains the clouds, the water vesicles being filled with it. M. Jobard's fertile mind is so pressed with making theories for every thing, that it does not give time for verifying them. He gets rid of the hydrogen again by supposing it to form water; and also *ammonia with the nitrogen* of the air.—*Ibid.*

Chemical characteristics of Pure Glycerin.—According to Dr. Cap, pure glycerin, suitable for medicinal purposes, should have the following properties: It should be odorless, even when rubbed between the hands; its consistency must be that of thick syrup. It must be of honey-like taste, strongly sweet, its reaction nearly neutral; one volume of glycerin must be perfectly soluble in one volume of alcohol, acidulated with $^1/_{100}$ of sulphuric acid, without forming a deposit, when standing in a cool place, even after twelve hours. Further: 1 volume of glycerin must dissolve in two volumes of a mixture of $100^0/_0$ alcohol and $50\ ^0/_0$ of sulphuric acid without

forming a precipitate (salts of lime), or leaving syrupy residua (adulteration with honey or simple syrup). In this way an addition of 10% of syrup may be detected; if it contains less, on adding a drop or two of sulphuric acid to the mixture, a white deposit forms immediately; glycerin dissolved and boiled with water should not be changed to a darker hue, which would indicate the presence of glucose.—*Med. Reporter.*

Editorial Department.

St. Louis Pharmaceutical Association.—In the report on the Progress of Pharmacy, made in September last to the A. P. Association, it was announced that the St. Louis Pharmaceutical Association had virtually ceased to exist. It is therefore with the greater pleasure that we are able to publish its reorganization under circumstances that augur favorably for its future usefulness. The following letter, from the Corresponding Secretary of the new Association, contains the announcement:—

St. Louis, Dec. 11th, 1857.

Mr. William Procter, Jr.—Dear Sir:—I thought you would be pleased to hear of the re-organization of the St. Louis Pharmaceutical Association, under very flattering prospects which occurred last night. We adopted the Constitution, By-Laws, and Code of Ethics of the late Pharmaceutical Association, and elected the following officers to serve until the annual meeting in January, viz:—

James O. Gallagher,	*President.*
Thomas Scott, Theodore Kabb,	*Vice Presidents.*
Eugene L. Massot,	*Corresponding Secretary.*
William L. Maddock,	*Recording Secretary.*
William H. Dornin,	*Treasurer.*
A. Godron, Joseph Murphy, Frederick Bohl, William B. Parker, Charles Bang,	*Executive Committee.*

Yours, &c., E. L. Massot.

Glycerin.—As the innumerable uses to which glycerin can be advantageously applied became known, the importance of its cheap production in a pure state becomes more and more apparent. The discovery by Tilghman, that fatty oils may be split into fatty acids and glycerin by contact with water at 550° Fahr. was a great advance, and evidently led to the discovery of Wilson, that when fatty oils are acted on by superheated steam at 550° Fahr., in a properly arranged distillatory apparatus, the fatty acids and glycerin distill over free from all fixed impurities. As the odorous fats and

volatile impurities probably rise in the early part of the process, they can be separated by fractioning the products and rejecting the first portions. The immense amount of glycerin that is thrown away in the *soap waste* of the soap boiler must be rendered available by a process capable of separating the volatile as well as fixed impurities from the glycerin it contains, before the latter can be produced at a low price. Hennell Stevens & Co., of Philada., have so far perfected a process of this kind as to produce glycerin almost tasteless and odorless from the concentrated fetid liquors of the soap maker, by apparatus involving the distillation of the glycerin. They have exhibited to us specimens of this glycerin, nearly equal to that of Price & Co., and with a little more experience with the process it is quite probable that they can get it to produce uniform results. The glycerin as it flows from the still has the sp. gr. of 1·25 and possesses but little color.

Tartro-citrate of Soda.—Mr. D. S. Dyson, of Washington, D. C., has called our attention to the "Tartro citric Lemonade," of T. E. Jenkins & Co. of Louisville, Kentucky, who propose it as a substitute for Citrate of Magnesia. We have had a bottle in possession for nearly four months, which has undergone no apparent change. It is a solution of tartrate of soda, saccharized and acidulated with citric acid. It has an agreeable taste, is possessed of about the same activity as the citrate of magnesia, and possesses the merit of being less expensive to make. Mr. Dyson was not aware of the proportion of tartrate of soda present, but we presume that six drachms of tartaric acid properly saturated with bicarbonate of soda, and rendered agreeable with lemon syrup, and afterwards citric acid and bicarbonate of soda to generate sufficient carbonic acid and leave the preparation agreeably acid would yield a good preparation. We have had the preparation tried, and find it possessed of the same degrees of activity as the Citrate of Magnesia, with about as little taste. As it is cheaper than the citrate, it may be substituted for that preparation, if found on more extensive trial to equal it in efficiency. Messrs. T. E. Jenkins & Co. vend large quantities in Louisville.

New Edition of Latin Pharmaceutical Labels, *published by authority of the Philadelphia College of Pharmacy.* The Latin Label Committee have just published two new books of Labels for the shop furniture of Apothecaries and Druggists, and another of smaller size for physicians' orders, and other uses where correct labels are desirable. Of the two former books, one is executed in black letter on yellow paper, with *forms* similar to the last bronze edition. The other is printed entirely from engraved plates, and presents a bronze ground with steel blue letters and outlines, which render it by far the most elegant edition yet published, and the best substitute for the artists' pencil yet published in this country. At the request of the Committee we have attached specimens of the labels to the advertising sheet of this number, which contains an advertisement referring to them.

CAOUTCHOUC.—A correspondent calls attention to the fact that gum elastic macerated in chloroform swells out very much, becomes sticky and plastic, and may then be used for mending gum elastic shoes, tubes, etc., if applied quickly, before the chloroform evaporates. The gum elastic resumes its original consistence on the evaporation of the solvent.

Proceedings of the American Pharmaceutical Association at the Sixth Annual Meeting held in Philadelphia, Sept. 1857, *with the Constitution and List of the Members.* Philadelphia, 1857. Pp. 178, octavo.

If the usefulness and numbers of the American Pharmaceutical Association increase in ratio with the size of its printed annual "Proceedings," it will ere long more than fulfil the brightest hopes of its early supporters. The volume before us contains so much that is valuable both as information and for future reference, that it fully merits a place in the library. The work is in five parts: 1st. The Minutes of the several Sessions of the Meeting. 2d. The Reports of the Standing Committees. 3d. Scientific Reports on referred subjects. 4th. Voluntary papers; and lastly, an Appendix. We have already (in our last issue) published the minutes and some of the papers, and several others will be found in the present number. We propose in a succinct manner to refer here to the second part, or that embracing the reports of Standing Committees. The first of the reports is, that on Weights and Measures, of which Dr. C. B. Guthrie was chairman. This Report, after setting forth irregularities at present existing in the weights and measures of this country and England, both as regards the standards of the measure of weight and capacity, as well as the instruments in use, directs their efforts to advocating the decimal system, as preferable to others, and to developing the views of J. H. Felton as set forth in the report of Marshall Lefferts, chairman of a Joint Committee of the N. Y. Chamber of Commerce, and American Geographical and Statistical Society, on the extension of the Decimal System to the weights and measures of the United States. The main features of this proposed system is to make the pound avoirdupois the *unit of weight*, and the Imperial English gallon of ten avoirdupois pounds of water the *unit of capacity*. The increments and decrements from these units are in decimals, whilst the terms used to designate them are as near as possible those in general use. Thus:

WEIGHTS.		MEASURES.	
10 grains	= 1 scruple	10 grains	= 1 scruple
10 scruples	= 1 dram	10 scruples	= 1 dram
10 drachms	= 1 ounce	10 drams	= 1 ounce
10 ounces	= 1 pound	10 ounces	= 1 pint
10 pounds	= 1 stone	10 pints	= 1 gallon
10 stones	= 1 hund'd wt.	10 gallons	= 1 anker
10 hundred weights	= 1 ton	10 ankers	= 1 tun

It will be seen by this statement that the value of the grain has been changed to 1–10,000th part of the avoirdupois pound instead of 1–7,000th as at present, and hence is but 7–10ths of a troy grain in quantity. This

is a consequence of making the pound the unit, most unfortunate for the pharmaceutical application of Mr. Felton's system, as the grain is by far the most important individual of the systems used by Apothecaries—that by which we convert one system into the other.

At page 34 it will be observed that Mr. Stearns, in a criticism on this report, shows the grave importance of this defect; and, whilst he approves of the general features of the plan, he suggests a new unit—*the troy grain*—which adds 3 tenths to the value of every member of the scale of weights and measures, and makes the pound = 10,000 grains, and the gallon = 100,000 grains. In viewing the relative eligibility of the *pound unit* and *grain unit* scales, the decision will be given according as their application in practice will involve principally the lesser or greater divisions of those scales;—For, whilst to the wholesale merchant and grocer the pound unit and its increments are of prime importance, and the divisions of the pound comparatively insignificant; so to the apothecary, and goldsmith, the grain unit and its increments up to a pound are chiefly important, and the higher divisions but of secondary use. In either case the innovations are so marked, and the change of value of the same terms so great and abrupt, that we question the propriety of adhering to the old nomenclature, except in the units. In our system of coinage, this was done by retaining the dollar as a unit and inventing names for the remainder. The objections to the French decimal system are chiefly its inconvertibility into troy grain values without seriously complex fractions, and its nomenclature, which is hardly simple enough for general adoption. Whatever system may be finally adopted, it should be readily convertible into the present standards, and should be adopted in Great Britain and the United States simultaneously, by legal enactment. Before this can be done effectively, in this country at least, years of close examination and discussion of the subject in all its bearings, and by all classes who are to be influenced by it, should be had, so as to create a public sentiment in its favor sufficiently forcible to sustain the measure during the infancy of its practical application.

Whatever arguments may be adduced in favor of the decimal system, there are some *practical* objections to it which should be clearly considered before too hastily changing our present standards, difficulties which all the power of the Great Napoleon could not master, but to which he had to succumb, by legalizing divisions of the kilogramme, approximating to those of the old systems in value. Our meaning can be better conveyed in the language of Dr. Ellis, (see vol. ii., p. 202, of this Journal): "Every one is struck at the first glance of this system, with the beautiful simplicity which it derives from decimal arithmetic. It appears, however, to have been overlooked, that although decimal arithmetic is admirably designed to facilitate the calculation of mere numbers, it is not equally well suited to the divisions of material substances. A line, weight, or measure, may be divided with the greatest ease, almost by the eye, into halves, quarters and eighths; but the division into fifth and tenth parts, is attended with

much greater difficulty. Moreover, the decimal division is itself only divided by the numbers two and five. So great are the advantages of the *duodecimal* division, divisible by two, three, four and six, that it was proposed when the French theory was in contemplation and under discussion, to substitute the number of twelve for ten, as the term of the periodical return to the unit."

Every apothecary can appreciate the force of these suggestions in the division of pill masses; and the practical difficulty of doing away with the quarters, eighths and sixteenths of a dollar will be found less in preference for such coins than in the inherent advantage and convenience of that mode of division over the decimal system in practice, when it comes to fractions.

The second Report, that on Poisons, of which S. S. Garrigues was Chairman, does not recommend any direct measures of a legislative character, but thinks that when such action is had it should arise from among the pharmaceutists of each State, directed to its Legislature. The difficulty of getting legislators to appreciate the position of the respectable pharmaceutist, in regard to the sale of poisons, is one strong objection to inviting their attention to it. In order to curb the illicit sale of poisons they impose a burdensome and oppressive series of precautionary measures on the regular pharmaceutist, which is a worse evil than that which it is proposed to remedy. The circular "appeal," as recommended by this Committee, was published in our last number, page 499.

The third Report, on the Progress of Pharmacy, is a bulky paper of thirty pages, and presents a succinct account of the principal items of observation and discovery in chemistry, materia medica and pharmacy, since last meeting, followed by remarks on the sale of poisons, the Colleges of Pharmacy, and the drug trade. It is useful as a means of reference to the several papers it notices.

The fourth Report, "On Local Unofficinal Formulæ," is a paper of considerable length, embracing a great variety of preparations, both permanent and extemporaneous, we cannot do better than select a few of these, which are as follows:—

Dr. Marshall Hall's Dinner Pills.

Take of Powdered Barbadoes Aloes, Soap, Powdered Ext. Liquorice, equal parts.
Molasses ..... sufficient quantity.

Make a mass and form into pills of four grains each

Eccoprotic Powder.

Take of Powdered Rhubarb, Calcined Magnesia, of each 1 oz.

Mix.

Ricord's Aromatic Wine.

Take of Rue, Sage, Hyssop, Rosemary, Lavender, Absinth, Rose Leaves, Thyme and Elder Flowers ..... of each. 4 oz.
Bordeaux Wine ..... 9 pts.

Digest for two weeks, strain with expression and filter, then add wine to make 9 pints. Then add

Tannic Acid ..... } of each
Alum ..... } 9 oz.
Wine of Opium ..... }

Mix.

Sweet Wine of Iron.

Take of Tart. Iron and Potas ..... 3 drs.
Water of Ammonia ..... 1 dr.
Sweet Malaga Wine ..... 1 pint.

Dissolve by trituration.

Canada Liniment.

Take of Water of Ammonia ..... 1 oz.
Olive Oil ..... 1 oz.
Oil of Turpentine ..... 1 oz.
Alcohol ..... 1 oz.
Oil of Peppermint ..... ½ oz.

Mix.

Gregory's Powder.

Take of Calc. Magnes ..... 6 drs.
Powdered Rhubarb ..... 3 drs.
Powdered Ginger ..... 1 dr.

Mix.

Troch. Sanguin. Canad.

℞. Pulv. Sang. Canad ..... ℥ss.
Pulv. Ext. Glycyrrh ..... ℥viij.
Tinct. Tolutan ..... ℥j.
Syr. Tolutan ..... q. s.

Mix. and make into 480 Troches.

Ung. Sedativ. (Dalley's Subst.)

℞. Acet. Morph ..... gr. ij.
Plumb. Carb ..... gr. v.
Plumb. Acet ..... gr. xv.
Ung. Simplic ..... ℥j.

Mix. Ft. Ung.

Syrup. Tarazaci Comp.

℞. Eupatorii Perf ..... ℥ij.
Rad. Zingib ..... ℥ss.
Caryophylli ..... ℥ss.
Aquæ ..... Oiss.

Simmer away one-third, strain and add

Sacchari albi	℥vi.
Ext. Taraxaci	℥iv.
Spir. Vini Gall. Opt	℥viij.

Tinct. Chloroformi.

℞. Chloroformi, Tinct. Opii, Tinct. Camphoræ, Spt. Ammoniæ Arom	*aa*	℥iii.
Ol. Cinnam		gtt. vi.
Spt. Vin. Galli		℥iv.

The length to which this notice has grown will prevent us from noticing the other reports at this time, but we hope to resume the subject in a future number.

MEDICAL LEXICON—*A Dictionary of Medical Science;* containing a concise explanation of the various subjects and terms of anatomy, physiology, pathology, hygiene, therapeutics, pharmacology, pharmacy, surgery, obstetrics, medical jurisprudence, dentistry, &c.; notices of climate and mineral waters; formulæ for officinal, empyrical and dietetic preparations, etc.; with French and other synonymes. By ROBLEY DUNGLISON, M. D., LL. D., &c.; revised and greatly enlarged. Philadelphia. Blanchard & Lea, 1857. Pp. 992, octavo.

As a general rule, the time of an apothecary is so much occupied with the frequent interruptions of business, that his ability to compass the study of many subjects collateral to pharmacy in special treatises is virtually ignored, and he has too often to pass them by unexamined even in outline. Under these circumstances, such works as the one under consideration prove themselves to be exceedingly useful, by bringing within the range of a single volume, a vast fund of information on the medical sciences, expressed in a manner to give the largest amount of knowledge in the least space. If for no other reason than to familiarize himself with medical and other scientific terms and learn their etymology, the apothecary should possess such a work; and certainly no lexicon has stronger claims to his favor than that of Dr. Dunglison, the title of which we have given. As an evidence of the high repute in which this Dictionary is held by the medical profession, we may suggest that the present is the *fifteenth* edition; and that it is not a mere reprint of previous issues, it is sufficient to state that about 6000 subjects and terms have been added by the untiring labors of the author, bringing the whole number up to near 60,000. Among these, botanical, chemical and pharmaceutical terms are numerously interspersed.

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FOR THE THIRTY-SEVENTH SESSION, 1857—58.

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